IDENTIFYING THE INFLUENCIAL FACTORS ON ACADAMIC PERFORMANCE OF SINGLE SEX EDUCATION SYSTEM AND CO-EDUCATION SYSTEM: A CASE STUDY

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Degree of Master of Science

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Dissertation submitted in partial fulfillment of the requirements for the Degree of Master of Science in Business Statistics

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DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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The above candidate has carried out research for the master dissertation under my supervision.

Name of the Supervisor: Prof. T S G Peiris

Signature of the Supervisor: Date:

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Amid the difficulties, I was able to pursue the research towards its completion. However, this would not have been possible had it not been for some people who were generous and kind enough to share their time and effort.

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ABSTRACT

Sri Lankan society expects each and every one to be a higher achiever in each level of the process of formal education. Government of Sri Lanka has enshrined the right to free education in the constitution. In previous studies it had been found that academic performance of single sex education system is significantly better than that of co-education system in Colombo Education Zone (CEZ). The purpose of this study was to identify the influential factors on academic performance of single sex education system and co-education system. For this study 300 senior secondary level students from 10 schools in CEZ were selected. The sampling procedure was Purposive Stratified Random Sampling. Primary data were collected through a structural questionnaire consisting of 24 questions with 4-point likert Scale. Secondary data were collected from Department of Examinations and Colombo Zonal Education Office. It was found that the student performance in single sex education schools is significantly higher than that in the co-educational schools. Exploratory Factor Analysis (EFA) was carried out to extract factors as all criteria for EFA satisfied the observed data. The six factors identified are competitiveness, cooperation, teachers' dedication, confidence, addiction and peer effects. These factors were found to be invariant of the three types of orthogonal rotations namely Varimax, Equamax and Quartimax and the two types of factor extraction methods named Principle Component Factoring (PCF) and Principal Axis Factoring (PAF). The first factor, competitiveness consists of the three variables namely: satisfied on academic activities, enthusiastic to get high marks, enthusiastic to answer the question and competitive in studies. The second factor, cooperation consists of group study, coverage of missed lessons, sharing knowledge, sensitive to the issues of friends, and assistance to the issues of friends. Teachers' dedication consists of teachers' timely attendance to the classes, covering the syllabus and finding additional time to cover syllabus. The confidence factor consists of mobile phone usage and time spent in social websites. Fifth factor consists of answering the questions without any hesitation, others' attention and confidence on passing the examinations. Factor six consists of competitiveness in extra-curricular activities, bringing friends to correct the path and spending leisure time with friends. It is recommended that these results be used effectively by decision makers for the development of the senior secondary level education system in CEZ and to carry out similar studies in other educational zones in Sri Lanka

Keywords: Academic Performances, Co-education System, Factor Analysis, Senior Secondary Level Students, Single Sex Education System

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LIST OF ABBREVIATIONS

CEZ - Colombo Educational Zone

CFA - Confirmatory Factor Analysis

EFA - Exploratory Factor Analysis

PCF - Principle Component Factoring

PAF - Principal Axis Factoring

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CHAPTER 1

INTRODUCTION

1.1 Education

Education is a perennial process of adjustment is higher for the creatures that have evolved physically, mentally free and conscious of God as manifested in the environment, intellectual, emotional and willingness of humans (Hasyim, 2013).The word education is derived from the Latin word *ēdućatioń*. Education frequently takes place under the guidance of educators. Learners may also educate themselves. Educational method includes storytelling, discussion, teaching, training, and direct research (Reza, 2014).

Education can take place in formal or informal settings. Formal education occurs in a structured environment whose explicit purpose is teaching students. Mostly it takes place in school environment with classrooms of multiple students learning together with trained certified teachers of the subject. Usually, school systems are designed around a set of values or ideas that governs all educational choice in that system.

Informal education does not have a systematic way to learn. Informal learning usually takes place outside educational establishments. That is, it occurs in a variety of places such as in homework and in daily interactions and shared relationships among members of society. Mostly, language acquisition, cultural norms and manners are learnt in a way informal. The informal education has captured young generation by media. Before invention of reading and writing, people lived in an environment where they struggled to survive against natural forces, animals and other humans. To survive, preliterate people developed skills that grew into cultural and educational patterns. For culture of a particular group to continue into the future, people had to transmit it, or pass it on, from adults to children. The earliest educational processes involved sharing information about gathering food and providing shelter; making weapons and other

tools; learning language; and acquiring the values, behavior, and religious rites or practices of a given culture.

Early system of formal education was based on particular places like schools, pirivenas, dhamma schools and private classes. But, people in new generation try to use electronic technology for study purposes. In 2012, the modern use of electronic technology called e-learning had grown 14 times than traditional learning (History of Education, 2008).

Education plays a vital role in our success in the personal growth. The more you have knowledge the more you grow. Education will help you in determining what is good or what is bad for you. Education is a force which transforms a person to live a better life and even towards his social wellbeing. Without education, a person is incomplete and so, education makes a right thinker and a correct decision maker of a man.

Late President of South Africa, Nelson Mandela said that "Education is the most powerful weapon we can use to change the world". Article 26 in Universal Declaration for Human Rights states that everyone has the right to education. In most countries, education is compulsory for all children up to a certain age and this age limit varies from country to country.

Since 1909 the school attendance ratio of children in the developing world has increased. Before that a small minority of boys attended school. By the start of the 21st century a majority of children attended school. Therefore universal primary education is one among eight International Millennium Development Goals. A progress has been made in the past decade though barriers still remain. Right to education has been recognized by some governments at global level. Article 13 of the United Nations International Convention of Economic Social and Cultural Rights of 1966 has recognized right to education as a Universal Right.

1.2 System of Education in Sri Lanka

Provision of free education for every child of school age is a national policy in Sri Lanka. It is responsibility of all stakeholders to contribute to improve the system of education.

The system of education in Sri Lanka upto colonial era was designed primarily with a relatively low technology. At a time when printing was not known, knowledge was transmitted from generation to generation verbally and was memorized by pupils. Then texts were written on ola leaves. A majority of the population was illiterate. Ensuring learning among the Sinhalese was the job of Buddhist monks. Literate monks would teach privileged students in temples. Its curriculum consisted of Sinhala alphabet, memorization of elementary Buddhist literature, auspicious traits or *magullakuna*, and classical stories of the Buddha's life. The pursuit of higher education typically was reserved for men who became monks and took place at Pirivenas dedicated almost exclusively for memorization and commentary of Pali scriptures. Among Tamils, village schools which located near temples, were run by literate Brahmins or educated *vellalas*. Technical training was highly developed for students of Arts. This training was generally the prerogative of a closed group, castes, or families. Knowledge was often passed down from father to son (Buddhistdoor International Sean Mós, 2014).

Mostly it was confined to male students. Colonization brought European style of education to Sri Lanka. During that period a few females got the opportunity to go to school and most females remained un-educated. During the Portuguese rule, hundred schools were established as designed to foster a Roman Catholic culture among the growing Christian community in the low country. The Dutch took over in 1656; they set up a well-organized system of primary school to support the missionary efforts of the Dutch Reformist Church. In 1796, the British takeover led to closing of many Dutch schools resulting in a short term contraction of European style education in the low country.

In 1870, the system of education in Sri Lanka was revolutionized. The government began to expand the number of state schools and instituted a program of offering grants for private schools that met official standards. Medical and law colleges were opened in Colombo. Private schools delivering teaching in English offered the best road for advancement as dominated by Christian organizations were renamed. Concentrated in the southwest, they attracted a disproportionate number of Christian and Tamil students. Although institutions functioning in Tamil and Sinhala media continued to function as elementary schools, Secondary institutions that taught exclusively in English attracted the elite male clientele destined for administrative positions. The education of women lagged behind.

In year 1896 the Department of Public Institutions was established to manage government schools and regulate management of assisted schools. After legislative reforms in 1931, the system of semi-autonomous government was established and election of representatives to the State Council by popular vote was introduced. Executive Committees were set up. The Executive Committee on Education was entrusted to be supervised by Mr. C.W.W Kanangara who later became the first Minister of Education in Sri Lanka. This is the most important turning point in education in Sri Lanka. The education Ordinance No.31 of 1939 still functions as the basic law of education in Sri Lanka (Fernando, 2009).

1947 marks yet another important milestone in the system Sri Lankan education. It is the year in which free education was introduced to Sri Lanka. Education became state funded and was offered free of charge at all levels including the University level. Some of the important achievements that could be attached to the credit of Dr. Kannangara are democratization of education, establishment of network of central schools, diversification of the curriculum, improvement and establishment of the status of teachers setting up University of Ceylon. He introduced the new concept "Curriculum Should Develop a Child's Head, Heart and Hand" (Ministry of Human Resource Development, Education , 2005).

Today Sri Lanka is a developing country claiming a very high level of performance in the area of educational opportunities granted to a very large portion of its population. Policy of the Government of Sri Lanka is to provide free education from the primary stage to the first degree level of university education. The national education policy is formulated on recommendations of the National Education Commission established under an act of Parliament. The different stages of education can be classified as, early childhood care and education, general education, tertiary & university education and vocational education. The period of general education comprises grade 1 up to grade 13 in school system. School education structure is divided in to four parts. They are Primary, Junior Secondary, Senior Secondary and Collegiate. Primary level runs from Grade 1 to grade 5 and at the end of that period students may have to write a national examination called the Scholarship Examination. Junior secondary level runs from grade 6 to grade 9. Law in Sri Lanka has made it compulsory for students to be educated upto 14 years of age. Normally students 14 years age should be in grade 9. Segment from Grade 10 to Grade 11 is known as Senior Secondary Level which is the preparatory stage for General Certification of Education (Ordinary Level) [G.C.E. (O/L)]. Collegiate stage runs from grade 12 to grade 13. At the end of that level students should sit for General Certification of Education Advance Level [G.C.E. (A/L)] Examination. It is the entrance examination for the university (UNICEF Sri Lanka, 2013). After the general education they can move to the university education or vocational education.

Sri Lankan schools are categorized in manifold forms. There are four main types of schools classified based on grades and subjects taught as 1AB, 1C, Type 2, and Type 3 schools. Type 3 schools, which are primary schools. They have only grades 1 to 5. Type 2 schools have classes only up to G.C.E. (O/L). 1C schools have grades 1 to 13. However, G.C.E. (A/L) is maintained only in Arts and Commerce streams. 1AB schools maintain grades 1 to 13 in all three G.C.E. (A/L) subject streams (UNICEF Sri Lanka, 2013).

There are two types of schools classified on gender basis. They are co-educated schools and single sex schools. Central government and provincial councils monitor and control these schools. Accordingly, there are two types of schools. They are National Schools and Provincial Schools. On completion of general education, the students may advance to the university education or vocational education & training.

1.3 Gender and Education

Brains of Males and females are set up differently. Sex differences in the brain begin in the womb. Between 18 to 23 weeks of gestation, the developing brain is permanently transformed. 26 weeks of growth of an embryo enables distinguishing between a male brain and a female brain. The adult human brain weighs on average about 3lb (1.5 kg) with a size of around 1130 cm^3 in women and 1260 cm^3 in men although there is substantial individual variation. Male brains are about 10% larger than female brains and weigh 11-12% more than that of a woman (Zaidi, 2010).

Critics of the gender gap in education often focus on the advantage males have over females in science and mathematics, but fail to recognize the fact that males fall behind females in literacy. In fact, the latest national test scores, collected by the National Assessment of Educational Progress [NAEP], show that girls have reached or surpassed the reading performance of boys at all age levels (Atlanta, 2004). The literacy gap in grade 4 presents that males are developmentally two years behind the average girl in reading and writing. At the middle school level, statistics from the Educational Testing Service show that, the gap between males and females is six times in mathematical reasoning where mathematical reasoning favors males. These findings have spread across the world as findings of the International Association for Evaluation of Educational Achievement [IEA] where gender is the most powerful predictor of performance in a study of 14 countries.

1.4 Single Sex Education System

Single sex education takes place where the entire school set up is designed only for male students or only female students. Single sex education was more common up to the 19th century. It remains prevalent in many Muslim countries. Single sex education takes place when there is either one whole school is set up for only girls or it could consist of classroom for only boys or only girls. All students will be able to take whatever class of their preference without any added pressure to act cool for opposite sex (Yalcinkaya & Ulu, 2012).

Every child will be able to get an education to the best of his ability. Most parents of girls prefer single sex schools. Because they think, if their children go to girl's schools, there are more secure than the co-educated schools. Girls will be able to act more like themselves during schools. Because they have not put up in front of guys. They will not have to dress up to go to school to impress anyone. They will just be there to learn and nothing more. Boys also will have no need to impress anyone in school. They will just be there to learn and nothing more. They will be able to focus on just their education and nothing more.

Single sex education in many cultures is advocated on the basis of tradition as well as religion and this practice was common before nineteenth century. However, there has been resurgence of interest in single sex schools in modern societies across the globe. Recently both public and private sector show more interest in single sex schools than in co-educational schools.

1.5 Co-educational System

Co-education refers to the integrated educational system where education of both boys and girls is arranged in the same environment. First co-educational institution started in Scotland, United Kingdom. It was founded by John McNabb. The ancient Greek and Chinese societies focused primarily on male education. In Rome availability of education was gradually extended to women. But they were separate from men. In the late 19th and early 20th centuries, co-education began to be much more widely accepted.

After reformation, co-education was introduced in Western Europe. The Societies of Friends in England, as well as in the United States, pioneered co-education as they maintained universal education and in settlements in British colonies, boys and girls commonly attended school together (Rosàs, 2013).

Co-education promotes equality and harmony between two genders. Plato, the Greek philosopher believed that co-education helped in the developments of personality of both women and men by creating a feeling of comradeship among them. In the west, the importance of co-education has been felt since ancient times (Yalcinkaya & Ulu, 2012). In ancient India co-education was prevalent in few places. But gradually female education began to be ignored. Moreover, the system of education was quite different from that of today. Today co-education is prevalent in almost all over the world.

1.6 Problem Statement

There are lot of research papers published on the base of single sex education and system of co-education. Mostly the performance has been tested comparatively among single sex and co-educated schools in terms of performance in Mathematics.

Most researches to-date have been conducted on the effects of single sex schools and co-educated schools by the subject of Mathematics. The number of single sex schools in public sector has steadily increased in recent years. As previous research indicates girls and boys learn to behave in different forms. Because their brain is biologically different.

The question to be addressed by this study is whether there is a difference in academic performance between students in co- educated schools and single sex schools. Therefore it is questioned which education system shows a higher performance. It can also help determine whether separating the sex in interaction would help bridge the achievement gap that existing between girls and boys. Also there are lots of factors affecting that situation. Mainly, socioeconomic background of the student, peer group effects, management practice and school culture, parents' intervention and students' preferences.

1.7 Objective

In view of the above, the objective of the study is:

To identify the influential factors on academic performance in the systems of single sex education and co-education.

1.8 Significance of the Study

The findings of this study can be used to;

- Inform professionals in practice how to identify the best practices that can be found for professional development of teachers to improve academic performance of student.
- Determine the best allocation of resources for teachers and schools.
- Support parents who favor the schools.

1.9 Chapter Organization

Background of the study was discussed in chapter one. It consists of a brief introduction on study, problem statement, objective of the research, significance of the study, study area, methodology and scope and limitations.

Chapter two includes literature review of this study. It discussed previous researches related to this study. Methodology of the study was discussed under chapter three. It includes sample selection method, area of the sample, data gathering methods and data analysis method. Chapter four presents data in appropriate and meaningful ways. Also analysis of the study was presented under this chapter. Summary of the findings and recommendations are discussed in chapter five.

CHAPTER 2

LITERATURE REVIEW

This chapter discusses the previous research work and articles related to the different academic performances in single sex education system and co-education system and factors influencing it.

2.1 Academic Performance in Single Sex Schools and Co-educational Schools

There has been an ongoing debate about the advantages of single sex education and co-education for children's educational and socio emotional achievements. Therefore, a number of studies have been carried out on the academic performance of these two systems of education. However, general results of the past studies have been inconsistent. Some studies proved benefits of co-educational system (Smith, 1994; Yates, 2002; Lee & Bryk, 1986), while some studies were proved the benefits of single sex educational system (Malik, 2013; Carol E. Thom, 2006; Madigam, 2006). This issue has been further complicated by claiming that school type may have a differential effect on achievement of girls and boys (Clifford, 1998).

Children attending single sex schools obtain significantly higher levels of educational achievement compared to children attending co-educational secondary schools (Woodward, Fergusson, & Horwood, 1999). These differences in achievement were reflected in school certificate attainment, reading ability at age 18, early school leaving, leaving school without educational qualifications and exposure to unemployment.

The results of the study of Malik (2013) in Pakistan indicate significantly better academic achievements and overall more positive traits for boys and girls in the single sex schools ($p < 0.05$) as compared to the boys and girls in the co-educational schools. Also this study shows the difference between boys and girls in the two types of schools and also within the same type of schools. The implication was greater for girls than for boys. In the socio-cultural context of Pakistan, girls feel more uncomfortable and show reserved behavior if boys are around. Also, boys and girls feel higher degree of shyness and nervousness in the co-educational environment as adolescent age starts.

A study carried out by Lee and Bryk (1986) has shown that the students at single sex schools had not only superior academic achievements, but also had a higher educational aspiration, more positive attitudes toward academic work than students at co-educational schools. Furthermore, boys in the single sex schools scored better in reading, writing and mathematics than boys in co-educational schools. Girls in single sex school scored better in science and reading than girls in co-educational schools.

According to Carlo E & Thom (2006) student's achievement in reading /language and art was significantly higher ($p<0.05$) in those students enrolled in single sex classes. Furthermore, students' achievement in mathematics was significantly higher in those students enrolled in single sex classes. But there was no significant difference in achievement when disaggregated by sex, race, special educational status and socio-economic status. The findings of the research of Madigan (2006) indicate that the single gender special educational environment provides greater comfort levels and fewer distractions in the classroom, increase school attendance and improve attitudes towards school in comparison with that in a coeducational classroom environment. Therefore, single gender educational environment was considered better than the co-education environment in that respect.

The study of Clifford (1998) compared through various activities the gender related attitudes towards in mathematics in between girls in single sex schools and co-educational schools. It was shown that the girls perform differently in these two types of schools at two age levels. Accordingly, it was observed that there is a significant difference in enjoying mathematics between single sex schools and co-educational schools. Mathamatics enjoyment rate in single sex schools amount to 63% whereas co-educational schools indicate only a rate of 37%.

In another study in Kenya by Mburu (2013), it was found that the type of school attended affected students' academic performance as a majority of girls who qualified to join tertiary institution was from single sex schools. According to the figure 2.1, 36.3% of boy respondents who attained C+ and above were from single sex schools and 24.2% who attained C+ and above were from co-educational schools. Girls from single sex schools who attained C+ and above amounted to 31.4% and the rate was

8.1% for those from co-educational schools. Therefore students who were in single sex schools attained significantly better than students in co-educational schools.

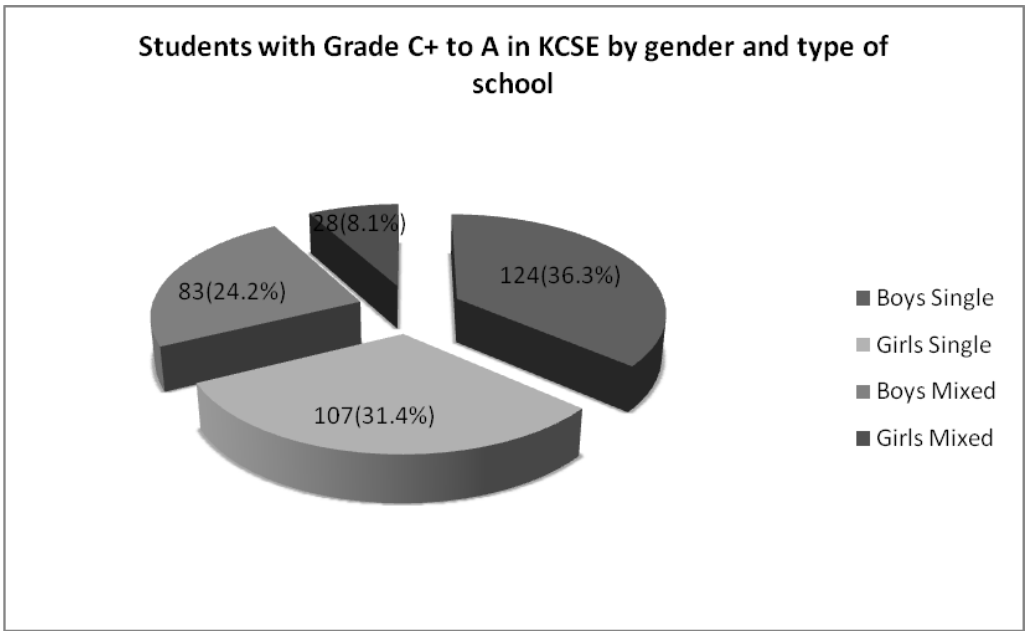

Figure 2.1: Student Performance According to the Type of Schools

Source: (Mburu, 2013)

According to the teachers' perceptions, the majority of participants believed that single sex classroom settings allowed students to achieve higher levels of both participation and performance of the number of respondents 82% has claimed that Single-sex PE class structures have an overall more effectiveness in achieving higher levels of students participation and performance in PE whereas 10% has claimed that coeducational PE class structures are overall more effective in achieving higher levels of student participation and performance in PE (Best, Pearson, & Webb, 2010).

A priority area for policy makers is to ensure that teacher training and curriculum development respond to girls' as well as boys' learning needs in all school. Single sex education is not a panacea for girls, but some situations make it an effective option. Two realities that commend the mixed model for special considerations are girls, specially adolescent girls, achieved better learning outcomes in some subjects if boys are not in the same class and girls and boys need to learn to listen, discuss and solve problems together (UNESCO, 2007).

The findings of Pahlk, Hyde and Allison (2014) do not support the view that single sex schooling provides benefits as compared with co-educational schooling. Single sex was compared with co-educational schooling for a wide array of students' outcomes including mathematics performance and attitudes, science performance and attitudes, verbal performance and attitudes, attitudes about school, gender stereo-typing, self-concept, interpersonal relations, aggression, victimization, and body image. They claimed that there is little evidence of an advantages single sex schooling for boys and girls.

2.2 Factors behind Different Academic Performance in Single Sex Educational System and Co-education System

Most of the previous studies have identified the gap between academic performance of single sex education system and academic performance of co-educational system occur due to many factors (Atlanta, 2004; Hughes, 2007; Kam, 2010). Considered performance as an outcome of the learning process. The common identified factors are socioeconomic factors, management practice and school culture, parents intervene, peer group effects and student preferences. The different educational systems should be considered on factors related with each of such systems to get their outcomes.

In most of the co-education classes boys dominated the school activities and they received more encouragement to work on through a problem than girls. Girls did not volunteer to contribute to classroom activities as they shied away from exchanging knowledge with the peers. They were not confident to share their knowledge and ideas in the co-educational background. Sharing knowledge is very important for the academic performance. Therefore co-educational schools were found unsuitable for the education of girls, while it was more suitable for education of boys than girls (Mburu, 2013).

Misbehaviors of the students in co-educational schools are lower than the single sex educational schools. Most of misbehaviors related to boys are use of drugs and alcohol, frequent sexual intercourse, stealing and fighting. In the single sex educational system it is easy to conjoin for them (Woodward, Horwood, & Fergusson, 1999). Girls in

New Zealand co-educational schools were at great risk of delinquency than early maturing girls in single sex schools (Caspi, et al, 1993). Also, Rutter, et al (1980) claimed that delinquent behaviors are more normative in co-educational schools.

The common conclusion is most of the past studies is that background of the school is the main factor behind educational achievements of the students. Teachers need to play a significant role of that background. Therefore, teacher characteristic are main influential factor for the students' performance. Teacher quality is considered to be the most important factor even though it is extremely hard to measure. There is a positive impact of teacher quality on students' performance. In single sex schools, the teacher is able to concentrate on the learning style of each sex. Also lesson plan, activities in the classroom could be designed according to the needs of the same sex (Malik, 2013). In single sex classrooms, teacher has continuous dialogue with girls and helps them in solving problems (Streitmatter, 1999). Also, Blair & Sanford (1999) showed that teachers were able to give more attention to teaching in the single sex classes than maintaining discipline in the coeducation classes.

Peer-competition is another driving force of the effort exerted by high-school students (Eisenkopf et al, 2014). Students in single sex education are more competitive than the students who are in co-educational schools (Spielhofer, et al, 2002).

2.3 Other Studies Related to Systems of Single Sex Education and Co-education

Gust (2014) carried out a review about systems of single sex vs co-education in Australia and United Kingdom using a diamond teaching model (Figure 2.2).

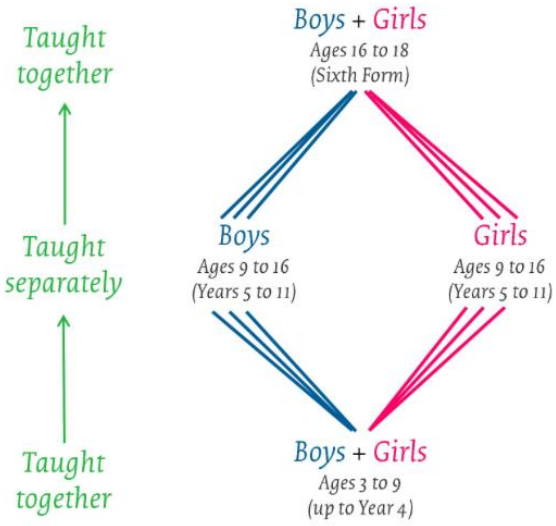

Figure 2.2: The Diamond Teaching Model

It is based on the behavior of the children. It gives many positive points for the parents and teachers. In the different age levels interaction between age group and gender is significant. Interaction effect of opposite gender also affects for their academic performance. Therefore it had been recommended to different academic system for different age limits.

A study conducted by Priyadarshani (2016) compares the academic performance of students in single sex educational school and co-educational school in Colombo educational zone for five subjects in G.C.E (O/L) examination. The study identified single sex education system has given a better performance than the co-education system for both male and female students irrespective of the subjects. Objective of that research was to identify the influential factors for the above result.

2.4 Summary of the Review

There has been an ongoing debate about the advantages of coeducation and single-sex education for children's socio-emotional and educational development. Most of the researchers found that single sex schools were better placed to meet educational needs of secondary level students than the co-educational schools. Some of the previous researchers identified management practice at school culture, peer group effects, parents intervene, misbehaviors of students, sharing knowledge, peer competition and teachers intervention as influential factors for that difference. The results acquired from their review are immensely useful to plan this study.

CHAPTER 3

MATERIALS AND METHODOLOGY

This chapter describes the research design, study area, population and sampling frame, data collection method, data presentation methods and statistical method used for data analysis.

3.1 Source of the Data

There are two sources of collecting data. They are primary data and secondary data. Both primary and secondary data were used for this study.

- Primary Data

  A primary data source is an original data source, that is, one in which the data are collected firsthand by the researcher for a specific research purpose or project (Salkind, 2010). It can be collected mainly through observation, interview, and questionnaires etc. In this study primary data were collected from senior secondary level students in Colombo educational zone.

- Secondary Data

  Secondary data are the data that have been already collected and readily available from other sources. Secondary data shall be collected from the publications and websites, journals, internet, annual reports, periodicals such as magazines, newspapers, and from subject related books etc. In this study secondary data were collected from Department of Examinations and Zonal Education Office of Colombo.

Details of the schools (number of schools, name of the schools and type of the schools) were collected from zonal education office of Colombo. Details of students who sat for the G.C.E (O/L) in the year 2016 were collected from Department of Examinations.

3.2 Population

There are nine provinces in Sri Lanka. This study was limited to Colombo district in western province. Furthermore, all types of schools are situated in Colombo district which consists of four educational zones. They are (i) Colombo educational zone, (ii) Homagama educational zone, (iii) Pliyandala educational zone and (iv) Sri Jayewardenapura educational zone. Colombo educational zone was selected purposively for study by considering resources such as cost, manpower, and time.

Therefore the population in this study is the students who sat for the G.C.E (O/L) in 2016 for the first time from the schools in the Colombo educational zone.

3.3 Sampling Procedure

There are 124 schools in Colombo educational zone belonging to four divisions namely Colombo North, Colombo south, Colombo central and Borella.

Schools were categorized in to four groups namely 1 AB, 1C, Type 2 and Type 3. Type 3 schools are primary schools. They only have classes up to grade 5. Thus, Type 3 schools were not considered in this study. There are 111 schools in above three type of schools. The names of the 111 schools are shown in appendix A. Each of these three types of groups has three different schools based on gender namely boys' schools, girls' schools and co-educational schools.

The schools are selected from each combination of school types. Type 1 and type 2 are shown in table 3.1.

Table 3.1: Schools in Colombo Educational Zone

	School_Type 2			**Total**
School__Type 1	**Co-educational**	**Boys**	**Girls**	
1AB	5	12	13	**30**
1C	16	9	15	**40**
Type 2	34	3	4	**41**
Total	55	24	32	**111**

Therefore sample procedure of this study is purposive random sampling method.

3.4 Sample Size When the Population Size is Known

Sample size (n) was estimated by using equation in 3.1. (Krejcie & Morgan, 1970).

$$\boldsymbol{n = \frac{\chi^2 Np(1-p)}{d^2(N-1) + \chi^2 p(1-p)}} \qquad (3.1)$$

χ^2- Table value of Chi-square at df =1 desired confidence level (95%)

N - Population Size

n – Sample size

p –Population Proportion (p is unknown and then p was taken as 0.5, so that p (1-p) is maximized)

d – Degree of accuracy (Expressed as a proportion)

Based on the resources such as time, manpower and cost, it was decided to select 10 schools and the 10 schools were allocated proportional basis as shown in table 3.2.

Table 3.2: Selected Schools

		School_Type 2			**Total**
S_Type 1		**Co-educational**	**Boys**	**Girls**	
	1AB	1	1	1	**3**
	1C	1	1	1	**3**
	Type 2	3	-	1	**4**
Total		**5**	**2**	**3**	**10**

There are 1236 students who sat for the G.C.E (O/L) in selected schools in the year 2016 at first attempt and then population size is 1236. Therefore the desired confidence level of 95% sample size was estimated using equation 3.1 and it found the sample size to be 293. As a result it was decided to consider 300 as sample size

3.5 Method of Data Collection

Structured questionnaires were used to collect the data from students. The questionnaires were used to gather more qualitative data to explain some of the discrepancies in the results achieved in some of the schools. A questionnaire consists of 24 questions (Appendix- B). It was used four point likert scale for all 24 questions. Because it was user friendly.

3.6 Method of Data Presentation

Descriptive statistics can be illustrated in an understandable fashion by presenting them graphically using statistical and data presentation tools. Different types of presentation methods can be used for different types of data. This study used bar charts and pie charts to display the data.

3.7 Factor Analysis

Factor analysis is a useful tool for investigating the reasons of variable relationships for complex concepts such as socioeconomic status, dietary patterns, or psychological scales. Factor analysis operates on the notion that measurable and observable variables can be reduced to a fewer latent variables that share a common variance and are unobservable, which is known as reducing dimensionality (Yong & Pearce,2013).

Factor analysis is a way to take a mass of data and shrinking it to a smaller data set that is more manageable and more understandable. It's a way to find hidden patterns, show how those patterns overlap and show what characteristics are seen in multiple patterns. It is also used to create a set of variables for similar items in the set. A "factor" is a set of observed variables that have similar response patterns; they are associated with a hidden variable that isn't directly measured. Factors are listed according to factor loadings, or how much variation in the data they can explain (Rahn,2018).

Factor analysis is more easily applicable to focus on main factors rather than many variables. It is easy to interpret.

There are two types of factor analysis. Namely (i) Confirmatory factor analysis and (ii) Exploratory factor analysis.

3.7.1 Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis is a multivariate statistical procedure that is used to test how well the measured variables represent the number of constructs. A confirmatory factor analysis assumes that you enter the factor analysis with a firm idea about the number of factors you will encounter, and about which variables will most likely load onto each factor (Rahn,2018). Confirmatory factor analysis allows the researcher to test the hypothesis that a relationship between the observed variables and their underlying latent construct(s) exist(s) (Suhr,1990).

3.7.2 Exploratory Factor Analysis (EFA)

Exploratory factor analysis is a multivariate statistical method designed to facilitate the postulation of latent variables that are thought to underlie and give rise to patterns of correlations in new domains of manifest variables. (Haig, 2010) . The researcher makes no a priori assumptions about relationships among factors. In general, an exploratory factor analysis prepares the variables to be used for cleaner structural equation modeling. An exploratory factor analysis should always be conducted for new datasets. A critical assumption of the exploratory factor analysis is that it is only appropriate for sets of non-nominal items which theoretically belong to reflective latent factors.

This study uses exploratory factor analysis.

The common five steps in exploratory factor analysis are shown in figure 3.1.

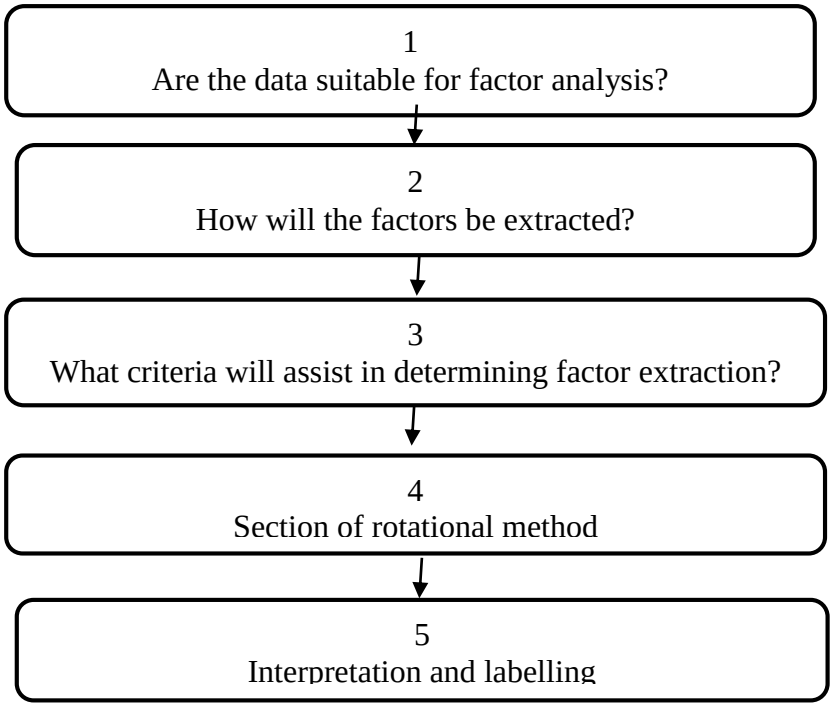

Figure 3.1: Steps of Exploratory Factor Analysis

Source: Wiliams, Brown and Onsman (2010)

3.7.3 Appropriateness of Data for Factor Analysis

Before the analysis, selected data should be verified for the suitability. The first step is to check whether the data is appropriate for factor analysis. The tests to be carried out prior to factor analysis are:

Correlation Matrix

When the data are appropriate, it is possible to create a correlation matrix by calculating the correlations between each pair of variables. It is required that there is a significant correlation among variables. Bartlett test also can be used for that.

$$H_0: \Sigma = I$$

$$H_1: \Sigma \neq I$$

The null hypothesis should be rejected to satisfy for factor analysis.

KMO Test

In SPSS the intercorrelation can be checked by using Bartlett's test of spherity, which "tests the null hypothesis that the original correlation matrix is an identity matrix". This test has to be significant: when the correlation matrix is an identity matrix, there would be no correlations between the variables.

- Kaiser-Meyer-Olkin Measure of Sampling Adequacy –

  The Kaiser-Meyer-Olkin Measure of Sampling Adequacy is a statistic that indicates the proportion of variance in variables that might be caused by underlying factors. This measure varies between 0 and 1, and values closer to 1 are better. A value of 0.6 is a suggested minimum value for factor analysis (Williams, Brown, & Onsman, 2010).

- Bartlett's Test of Sphericity –

  This tests the null hypothesis that the correlation matrix is an identity matrix. An identity matrix is matrix in which all diagonal elements are 1 and all off diagonal elements are 0. You want to reject this null hypothesis (Williams, Brown, & Onsman, 2010).

Cronbach's Alpha Statistic

Reliability means whether the data are consistent using different instruments to measure the data. Cronbach's Alpha Statistic (CAS) is a reliability test conducted within SPSS in order to measure the internal consistency. It is most commonly used when the questionnaire is developed using multiple likert scale statements to determine if the scale is reliable or not. The general rule of thumb is: if CAS $\geq$ 0.7 then data is recommended for factor analysis, otherwise not recommended (Peiris, 2018).

Normality

The standard Andreson Darlington test and standard Q-Q plots can be used to check the normality. Normality usually applied when using maximum likelihood method to extract the factor. But factor analysis is heavily used for categorical data where normality assumption is not satisfied (Peiris, 2018).

3.7.4 Extraction of Factor

There are various factor extraction methods. The common methods are:

- Principal components factoring (PCF)
- Principal axis factoring (PAF)
- Maximum likelihood
- Unweighted least squares
- Generalized least squares
- Alpha factoring
- Image factoring

The recommended factor extraction methods for likert scale data are Principal Components Factoring (PCF), Principal Axis Factoring (PAF) and Maximum Likelihood Method (Peiris, 2018).

Principal Components Factoring (PCF)

A factor extraction method is used to form uncorrelated linear combinations of the observed variables. The first component has maximum variance. Successive components explain progressively smaller portions of the variance and are all uncorrelated with each other. Principal components factoring is used to obtain the initial factor solution. It can be used when a correlation matrix is singular.

Principal Axis Factoring (PAF)

A method of extracting factors from the original correlation matrix, with squared multiple correlation coefficients placed in the diagonal as initial estimates of the communalities. These factor loadings are used to estimate new communalities that

replace the old communality estimates in the diagonal. Iterations continue until the changes in the communalities from one iteration to the next satisfy the convergence criterion for extraction.

In the case of Principal Components Factoring (PCF), the linear combination of variables results in components that account for all of the variance in the original data. Principal Axis Factor Analysis yields factors that account for the common variance in the original data (Stevens & Pituch, 2002).

3.7.5 Factor Rotation

Rotations are used to change the reference axes of the factors to make the factors more interpretable. Rotations are applied to the factors extracted from the data. Rotation methods are based on various complexity or simplicity functions. Rotation methods fall into two broad categories: orthogonal and oblique (referring to the angle maintained between the X and Y axes). Orthogonal rotations produce factors that are uncorrelated while oblique methods allow the factors to correlate (Osborne, 2015).

Orthogonal Rotation Methods

- Varimax

  Maximizes the sum of the variances of the squared loadings of a factor on all variables. This common method results in each variable having either a small or large loading on each factor.
- Equamax

  A weighted solution between the varimax rotation and the quartimax rotation. (Orthomax with $\gamma = N/2$ where N = number of factors)
- Quartimax

  Minimizes the number of factors needed to explain each variable.
  (Orthomax with $\gamma = 1$)

Oblique Rotation Methods

Some of the oblique rotation methods are

- Biquartimin, Covarimin, Obbiquartimax, Obequamax, and Obfactorparsimax

In this study used orthogonal rotation method for rotate the factors.

CHAPTER 4

RESULTS AND DISCUSSIONS

The purpose of this study was to identify the influential factors on academic performance of single sex schools and co-educational schools. This chapter contains the details of data analysis and the interpretations. The data were analyzed using SPSS.

4.1 Descriptive Statistics of the Selected Variables

4.1.1 Distribution of Co-educational Schools and Single Sex Schools in Colombo Educational Zone

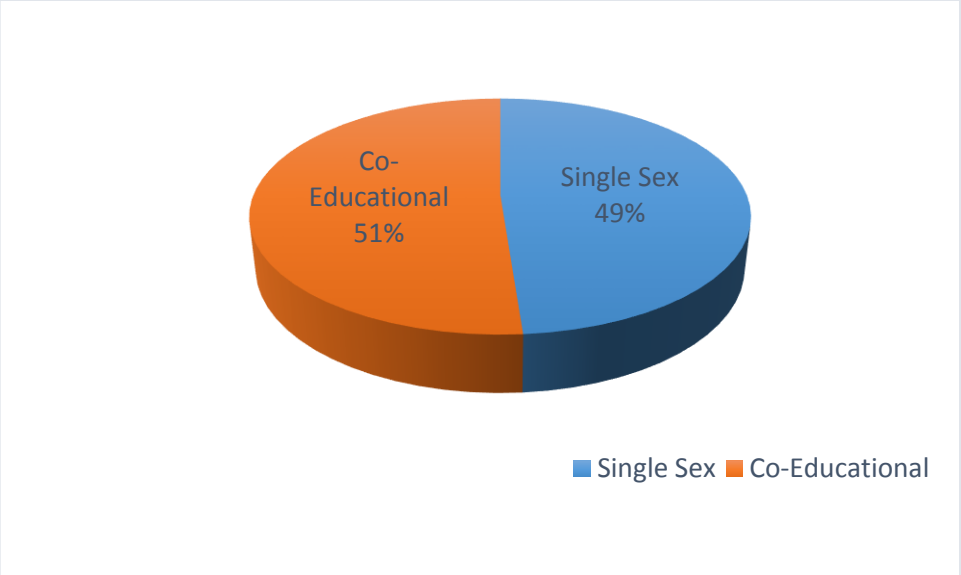

Figure 4.1: Number of Schools in Colombo Educational Based on School Type

There are 125 schools in Colombo educational zone. It consist of 21 national schools (16.8%) and 104 provincial schools (83.2%). Also 61 (48.8%) of them are single sex schools and 64 (51.2%) are co-educational schools.

4.1.2 Types of Schools in Colombo Educational Zone

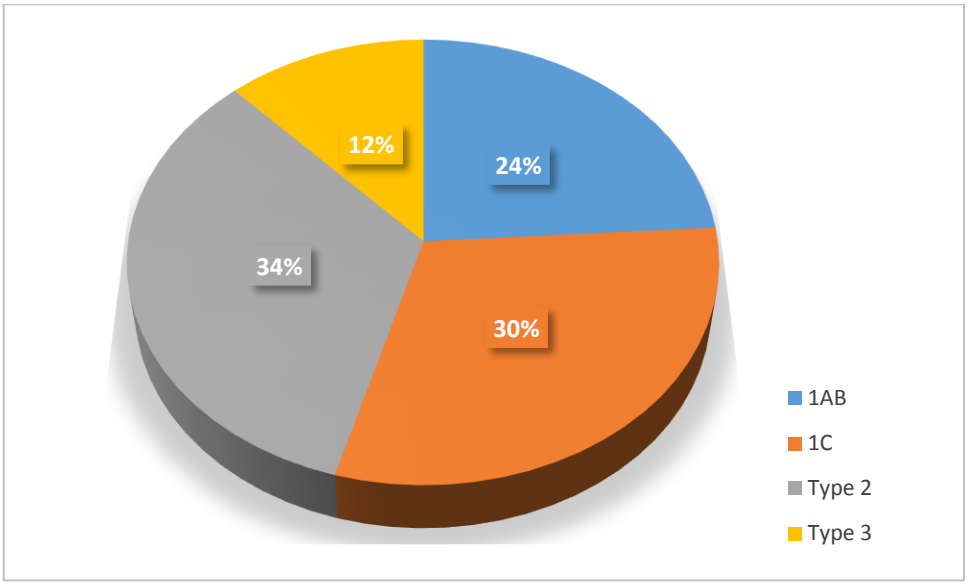

Figure 4.2: Distribution of schools categories

According to the Figure 4.2, there are 30 (24%) schools are 1AB, 38 schools are 1C, and 42 schools are type 2. Therefore most of the schools are Type 2. Only 15 schools are Type 3 and they are not considered in this study as they only conduct the classes up to grade 5.

4.1.3 Results of G.C. E (O/L) Examination in Colombo Educational Zone in Year 2016

Table 4.1: Results of G.C. E (O/L) Examination in Colombo Educational Zone in Year 2016

Type of School	No. of Students Sat for G.C.E (O/L)	No. of Students Eligible for G.C. E (A/L)	Percentage of Eligible for G.C.E(A/L)
Co-educational	1,968	726	36.89%
Single Sex	8,577	6,747	78.66%
Total	**10,545**	**7,473**	**70.87%**

Table 4.1 shows that 6747 students out of 8577 are eligible for the G.C.E (A/L) in single sex schools. But 726 students out of 1968 are eligible for G.C.E(A/L) in co-educational schools.

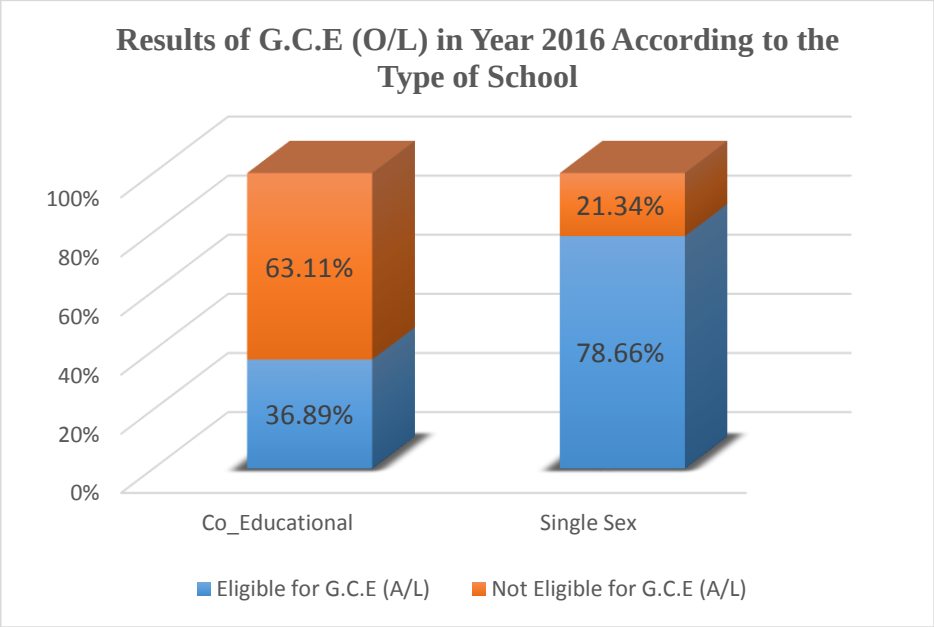

Figure 4.3: Results of G.C.E (O/L) Examination According to the Type of Schools in Year 2016

According to the results in Table 4.1 and Figure 4.3, students of eligible for the G.C.E (A/L) in single sex schools are higher than co-educational schools. Figure 4.3 shows 78.66% of students in single sex schools who sat for the G.C.E (O/L) examination are eligible for the G.C.E (A/L). But only 36.89% students in co-educational schools were eligible for the G.C.E (A/L).

4.1.4 Description of Questions in the Questionnaire

Ideas/ answers about below statements were present and analyzed in this study.

Table 4.2: Description of the Variables

Q_ No	Statements for the Questions	Variables
Q1	I like more to engage in group study than individual study	Group Study **[S1]**
Q2	My friends extend cooperation in covering of missed lessons	Coverage of Missed Learns **[S2]**
Q3	I share knowledge obtained from extra classes with my friends.	Sharing Knowledge **[S3]**
Q4	I am sensitive to the issues of my friends. I assists them to solve such issues.	Sensitive to the Issues of Friends **[S4]**
Q5	My friends provide their assistance to solve my issues.	Assistance to the issues by friends **[S5]**
Q6	I give answers for the questions raised by the teachers in the class room without any hesitation.	Answers the Questions without any Hesitation **[S6]**
Q7	When I answer the questions raised by the teachers in the classroom, I'm teased by my friend.	Undergone Friend's Jokes While Answer the Question **[S7]**
Q8	I'm hesitant to get others attention in the classroom.	Others' Attention **[S8]**
Q9	I have confidence on passing G.C.E (O/L) examination.	Confidence in Pass the Exam **[S9]**
Q10	I'm satisfied on my academic activities.	Satisfy in Academic Activities **[S10]**
Q11	I'm enthusiastic to get marks higher than the others.	Enthusiastic to Get High Marks **[S11]**
Q12	I'm enthusiastic more than other students to answer the questions raised by teachers relating to subjects	Enthusiastic to Answer the Questions **[S12]**
Q13	I'm very competitive in the functions related to the studies.	Competitive in Studies **[S13]**
Q14	I have got used to take alcohol and drugs.	Alcohol & Drugs Usage **[S14]**

Cont/-

Table 4.2 (Conti…)

Q15	I'm competitive in the extracurricular activities.	Competitive in Extra-curricular Activities **[S15]**
Q16	I spend more time with mobile phones.	Mobile Phone Usage **[S16]**
Q17	I spend more time in the social websites.	Spend Time in Social Websites **[S17]**
Q18	I make effort to bring my friends to the correct track when they are in wrong doings/ addicts.	Bring Friends to the Correct Track **[S18]**
Q19	I spend my holidays and leisure times with my friends.	Spend Leisure Time with Friends **[S19]**
Q20	There is a teacher for every subject.	Availability of Teachers **[S20]**
Q21	The teacher incharge of the subject comes to the classroom in the scheduled periods.	Teachers' Timely Attendance to the Class **[S21]**
Q22	The teacher duly covers the syllabus within the given time.	Cover the Syllabus **[S22]**
Q23	When the teacher is unable to cover the syllabus in the given time he/she gets additional time and cover it.	Additional Time to Cover the Syllabus **[S23]**
Q24	There are sufficient facilities such as laboratories, libraries, and computer laboratories etc. required to the academic activities comparing with in the school. (In comparison to the other schools in the zone)	Sufficient Facilities **[S24]**

4.1.5 Response of All Questions

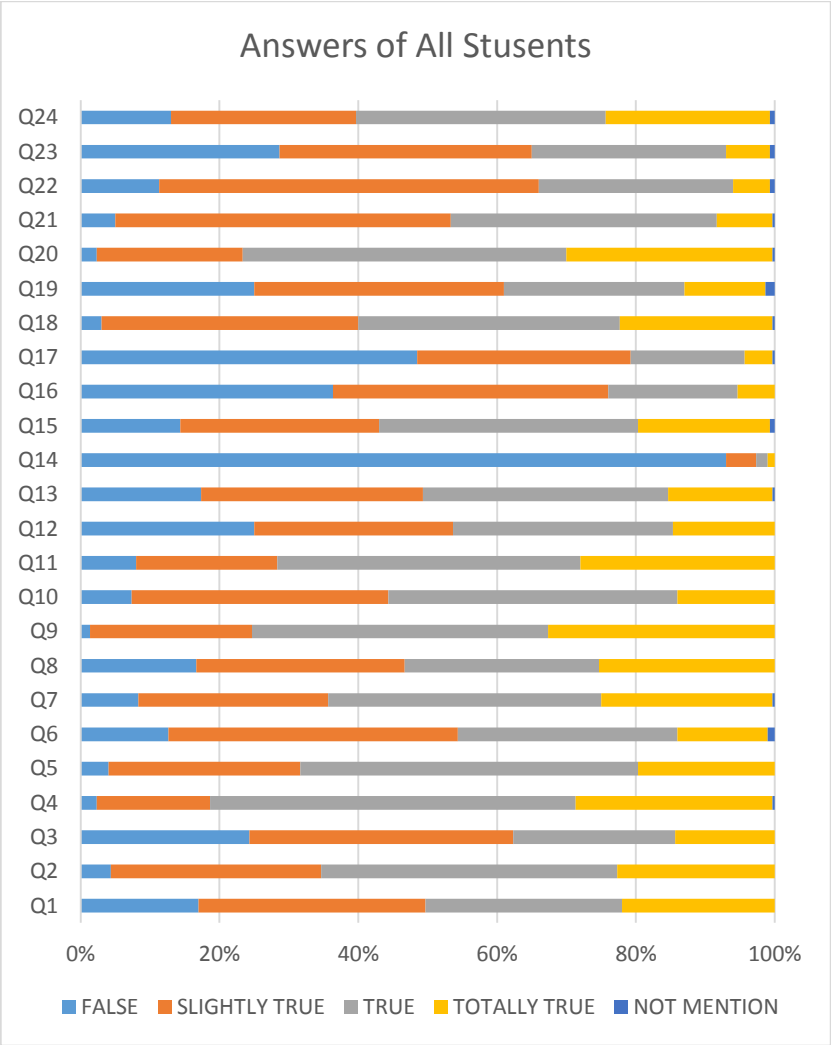

Figure 4.4: Summary of Answers of the All Students

Figure 4.4 shows answers of the all students for 24 questions in the questionnaire. According to the question no. 9 more than 75% of students have confidence on passing G.C.E (O/L) examination. Most of the students didn't share the knowledge with peers according to the question no.3. Answers of question no.2, 4, 5 and 18 shows most of the students are cooperate with the peers. But question no.18 shows they were not spend leisure time with the peers. Most of the students have competitive mind according to the question no.11, 12 and 13. According to the question no. 16 more than 50% students use mobile phones. Question no.22 and 23 shows most of the schools in sample not pay more attention for cover the syllabus.

4.1.6 Comparison of Response of Female Students in Co-educational Schools and Single Sex Schools

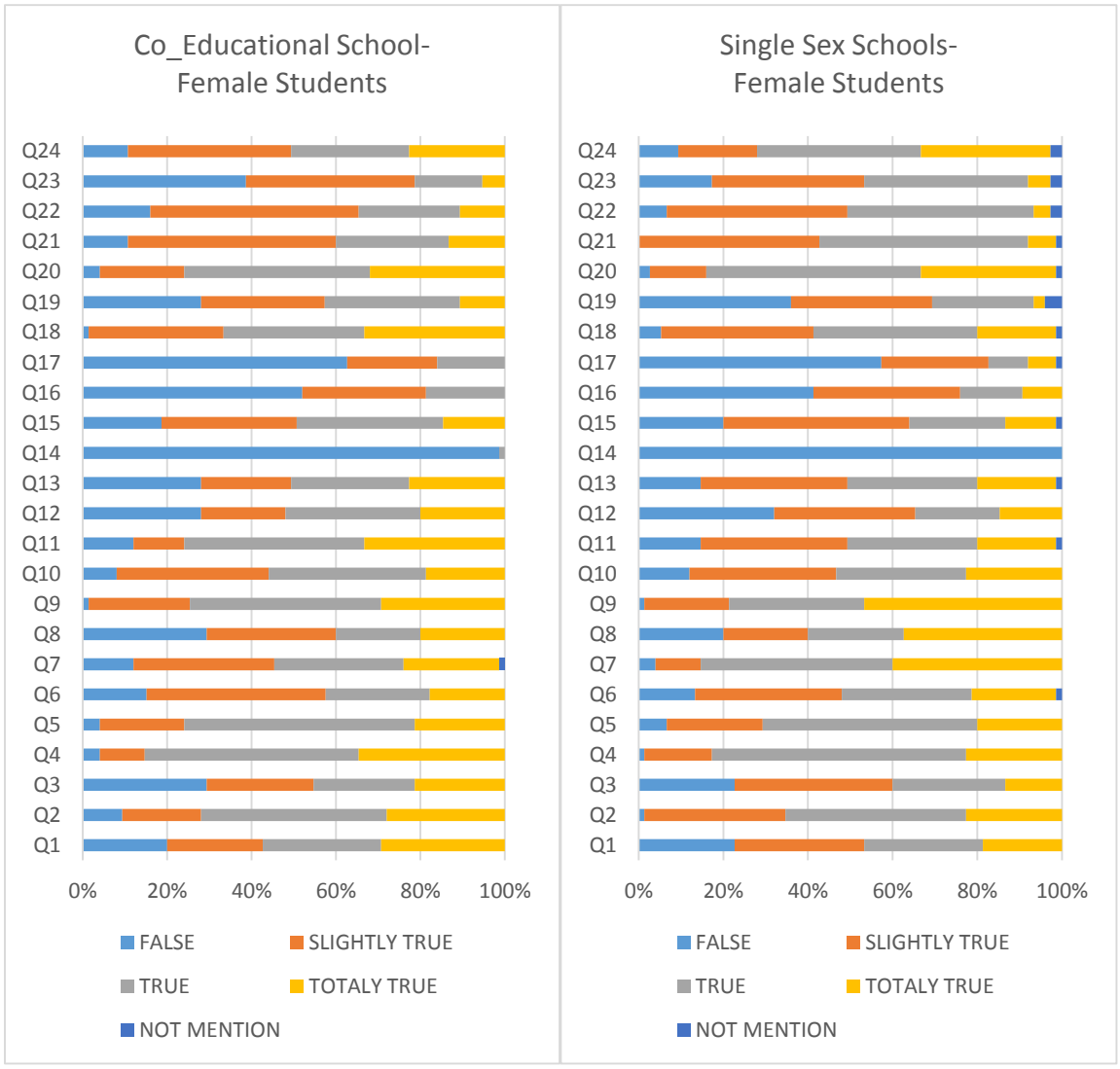

Figure 4.5: Answers of Female Students in Co-educational Schools & Single Sex Schools

Compare the answers of female students in co-educational schools in figure 4.5 and single sex schools Student in single sex schools more cooperate with the peers than the co-educational schools according to the question no.1, 2, 3, 4 and 5. Question no.7 and 8 reversed entered. Therefore female students of single sex schools more confidently perform their talents in the classroom than the female students in co-educational

school. Also, according to the answers of question no.09 shows female students of single sex schools have confidence on passing G.C.E (O/L) examination than the co-educational schools. Students in co-educational schools is more competitive than the single sex schools according to the question no. 11, 12, and 13. Mobile phone usage and spend time in the social websites of both education system is less than 50%. But student in single sex schools mobile phone usage and spend time in the social websites is more than the co-educational schools. Question no.22 and 23 shows single sex schools pay more attention to cover the syllabus than the co-educational schools. Also, answers of question no. 24 shows single sex schools have more facilities for studies than the co-educational schools.

4.1.7 Comparison of Response of Male Students in Co-educational Schools and Single Sex Schools

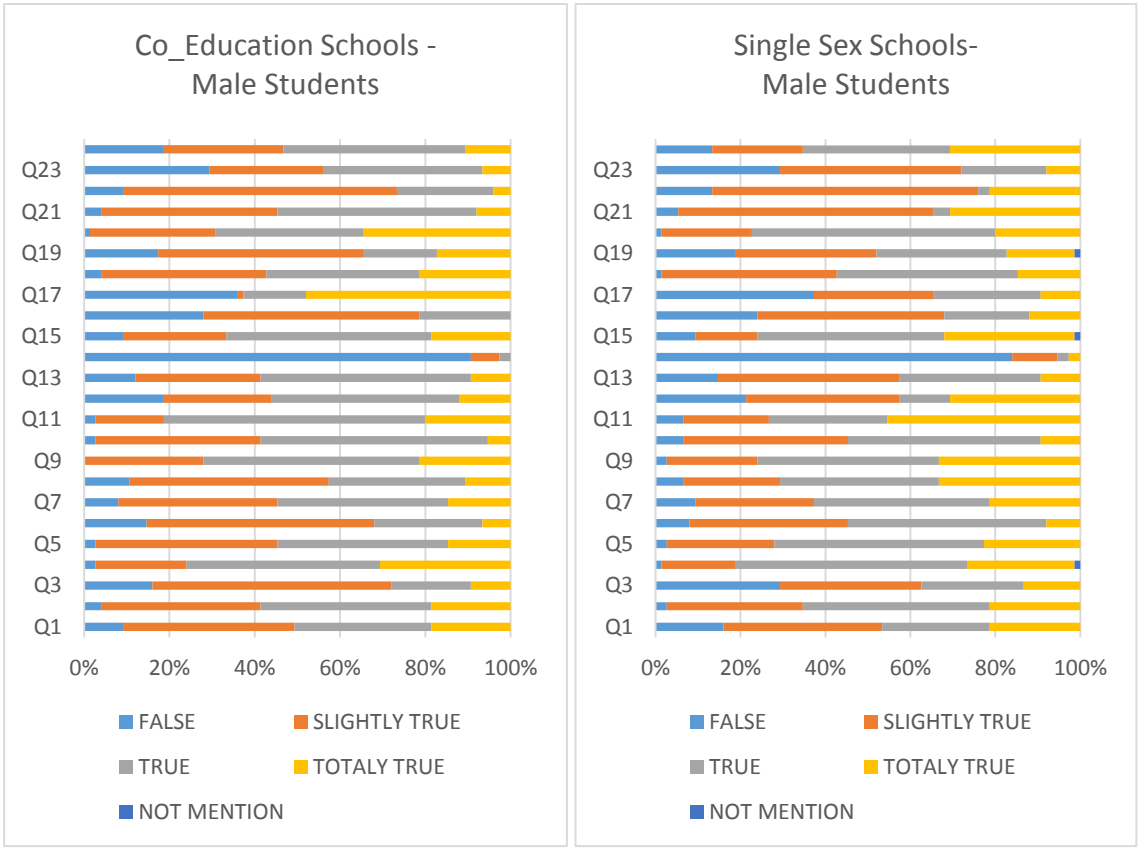

Figure 4.6*:* Answers of Male Students in Co-educational Schools & Single Sex Schools

Figure 4.6 shows comparison of answers of male students in co-educational schools and single sex schools. Both male students in co-educational schools and single sex schools like engage in group study than the individual study and cooperate with the peers. Male students in single sex schools have more confident in the classroom than the co-educational schools according to the question no. 6, 7, 8. But more confident about passing G.C.E (O/L) examination in co-educational schools than the single sex schools boys. Students in co-educational schools have more competitive mind than the students in single sex schools according to the question no. 11, 12 and 13. Mobile usage and time spend in social networks of students in single sex schools is more than the co-educational schools. Question no.22 and 23 shows single sex schools pay more attention to cover the syllabus than the co-educational schools. Also, answers of question no. 24 shows single sex schools have more facilities for studies than the co-educational schools.

4.2 Appropriateness of Data for Factor Analysis

4.2.1 Correlation of Observed Variables

In order to test whether the correlation matrix is significantly different from the identity matrix. Bartlett's Test of Sphericity was carried out and the results was shown in Table 4.3. Results in table 4.3 indicates that correlation matrix confirming the correlation structured is suitable for factor analysis. In fact the observed correlation matrix of the 24 variables also confirmed the above fact as correlation of many pairs are significantly different from zero.(Appendix C)

4.2.2 KMO Statistic

Table 4.3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.757
Bartlett's Test of Sphericity	Approx. Chi-Square	2.561E3
	df	276
	Sig.	.000

The KMO measures the sampling adequacy which should be greater than 0.6 for a satisfactory factor analysis to proceed. Value of Kaiser-Meyer-Olkin Measure of Sampling Adequacy in Table 4.3 greater than the 0.5.It indicate sample is adequacy factor analysis can be proceed.

4.2.3 Cronbach's Alpha Statistic

Table 4.4: Cronbach's Alpha Statistic

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.738	.737	24

According to the table 4.4, the alpha coefficient for the twenty four items is 0.738, suggesting that the items have relatively good internal consistency. It reflects high reliability of the measuring instrument.

Thus, it can be confirmed that the requirement for factor analysis are satisfied by the observed data set.

4.3 Factor Analysis

Correlation matrix is not sufficient to decide which variables to be include for the factor analysis. Final communalities of each variables after factor were extracted for eigen values greater than1 were considered. The final communalities and initial communalities when the factors were extracted from principle component analysis method is shown in Table 4.5.

4.3.1 Screening Variables for Factor Analysis

Table 4.5: Initial and Final Communalities for All Variables

S_No	Observed Variables	Initial	Extractio
1	Group Study	1.000	.518
2	Coverage of Missed	1.000	.651
3	Sharing Knowledge	1.000	.629
4	Sensitive to the Issues of Friend	1.000	.653
5	Assistance to the Issues by Friends	1.000	.638
6	Answers the Questions without any Hesitation.	1.000	.520
7	Undergone Friends Joke while Answer for the	1.000	.476
8	Others' Attention	1.000	.686
9	Confidence in Pass the Exam	1.000	.603
10	Satisfy in Academic Activities	1.000	.558
11	Enthusiastic to Get High Marks	1.000	.712
12	Enthusiastic to Answer the Questions	1.000	.801
13	Competitive in Studies	1.000	.694
14	Alcohol & Drugs Usage	1.000	.715
15	Competitive in Extra-curricular Activities.	1.000	.551
16	Mobile Phone Usage	1.000	.837
17	Spend Time in Social Websites	1.000	.870
18	Bring Friends to the Correct Track	1.000	.607
19	Spend Leisure Time with Friends	1.000	.731
20	Availability of Teachers	1.000	.383
21	Teachers' Timely Attendance to the Classes	1.000	.699
22	Cover the Syllabus	1.000	.676
23	Additional Time to Cover the Syllabus	1.000	.674
24	Sufficient Facilities	1.000	.456

The initial communalities in Table 4.5 indicate how much of the variance in the variables has been accounted for by the extracted factors. Initial communalities are taken as one for all variance in principle component analysis extracting method. There is no stranded criteria to select variance at this stage, the subjective criteria suggested by Chetty and Datt (2013) was applied. According to them the variables having less than 0.5 final communalities can be ignored for further analysis. Accordingly,

Answers for the Questions without Friends' Undergone Jokes	0.476
Availability of Teachers	0.386
Sufficient Facilities	0.456

variables were ignored. Therefor further analysis done without above variables.

The results of Initial and Final Communalities for selected 21 variables are shown in Table 4.6.

Table 4.6: Initial and Final Communalities for Selected Variables

S_No	Observed Variables	Initial	Extraction
1	Group Study	1.000	.528
2	Coverage of Missed	1.000	.648
3	Sharing Knowledge	1.000	.621
4	Sensitive to the Issues of Friend	1.000	.667
5	Assistance to the Issues by Friends	1.000	.656
6	Answers the Questions without any Hesitation.	1.000	.596
8	Others' Attention	1.000	.716
9	Confidence in Pass the Exam	1.000	.603
10	Satisfy in Academic Activities	1.000	.565
11	Enthusiastic to Get High Marks	1.000	.723
12	Enthusiastic to Answer the Questions	1.000	.812
13	Competitive in Studies	1.000	.695
14	Alcohol & Drugs Usage	1.000	.894
15	Competitive in Extra-curricular Activities.	1.000	.590
16	Mobile Phone Usage	1.000	.839
17	Spend Time in Social Websites	1.000	.876
18	Bring Friends to the Correct Track	1.000	.600
19	Spend Leisure Time with Friends	1.000	.766
21	Teachers' Timely Attendance to the Classes	1.000	.670
22	Cover the Syllabus	1.000	.716
23	Additional Time to Cover the Syllabus	1.000	.694

According to the Table 4.5 final communalities of all 21 variables were greater than the 0.5. Eigen analysis of above 21 variables are shown in Table 4.6.

Table 4.7: Results of Eigen Analysis for 21 Variables

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.322	20.580	20.580	4.322	20.580	20.580
2	2.959	14.091	34.671	2.959	14.091	34.671
3	2.025	9.645	44.315	2.025	9.645	44.315
4	1.639	7.806	52.122	1.639	7.806	52.122
5	1.282	6.105	58.226	1.282	6.105	58.226
6	1.196	5.694	63.921	1.196	5.694	63.921
7	1.051	5.006	68.927	1.051	5.006	68.927
8	.848	4.038	72.965			
9	.736	3.504	76.469			
10	.666	3.173	79.642			
11	.618	2.943	82.585			
12	.564	2.687	85.272			
13	.495	2.355	87.627			
14	.475	2.261	89.888			
15	.432	2.056	91.945			
16	.381	1.816	93.761			
17	.363	1.730	95.491			
18	.317	1.507	96.998			
19	.278	1.325	98.323			
20	.200	.952	99.276			
21	.152	.724	100.000			

Table 4.7 shows the eigenvalues associated with each linear factors before extraction, after extraction and after rotation. Eigenvalues which are greater than one determine the number of factors. In this study seven factors are greater than the one and those seven factors are acquired. The corresponding factor lording matrix is shown in Table 4.8

Table 4.8: Factor Loadings for 7-Factor Model

Variables	Factor Lodings						
	1	2	3	4	5	6	7
Group Study [S1]	-.092	.644	.245	.027	-.155	.138	.023
Coverage of Missed Lessons [S2]	.051	.788	.105	.023	-.101	.032	-.035
Sharing Knowledge [S3]	.087	.630	.446	.033	.014	-.076	.105
Sensitive to the Issues of Friend [S4]	-.006	.731	-.145	-.159	.119	.244	-.112
Assistance to the Issues by Friends [S5]	.014	.773	-.062	-.097	.182	.094	.047
Answer the Questions without any Hesitation [S6]	.295	.052	.084	-.075	.687	-.109	-.099
Others' Attention [S8]	-.121	-.014	.051	-.051	.833	.042	.007
Confidence in Pass the Exam [S9]	.496	-.009	.236	-.175	.516	.064	-.025
Satisfy in Academic Activities [S10]	.636	.038	.102	-.228	.271	.013	.154
Enthusiastic to Get High Marks [S11]	.825	.038	-.092	-.066	-.066	-.067	-.137
Enthusiastic to Answer the Questions [S12]	.870	-.046	.198	-.045	-.003	.073	.076
Competitive in Studies [S13]	.805	.011	.193	-.041	.081	.032	-.013
Alcohol & Drugs Usage [S14]	.039	-.002	-.092	.091	-.078	.000	.933
Competitive in Extra-curricular Activities [S15]	.227	.046	.066	.286	-.091	.632	-.205
Mobile Phone Usage [S16]	-.179	-.061	-.096	.881	-.122	.048	.024
Spend Time in Social Websites [S17]	-.136	-.056	-.031	.917	-.062	.030	.088
Bring Friends to the Correct Track [S18]	.042	.276	-.084	-.327	.056	.633	-.059
Spend Leisure Time with Friends [S19]	-.177	.163	.205	.111	-.004	.764	.264
Teachers' Timely Attendance to the Classes [S21]	.154	.100	.767	-.155	.008	-.009	-.152
Cover the Syllabus [S22]	.094	.107	.778	-.164	.126	.196	-.095
Additional Time to Cover the Syllabus [S23]	.139	.037	.787	.169	.114	.000	.114

According to factor scores in Table 4.8 four variables loaded to the first factor. Variables of S10, S11, S12 and 13 in the first factor. Variables of S1, S2, S3, S4 and S5 in the factor two. S21, S22, and S23 variables are loaded on third component. Fourth factor consist with variable S16, S17 and S18. Variable S6, S8, S9 lorded with fifth component and S15, S18 and S19 variables loaded with sixth component. Seventh component only has 14^{th} variable [S14]. Seventh component has only one variable.

Generally only one variable is not consider for a factor. Therefore that variable (S14) was ignored and carried out factor analysis again. Also as per the figure 4.1, 93% of students are not agreed with that statements. Which also justified the exclusion of the variable S14. This factor analysis was finally carried out for 20 variables

4.3.2 Final Factor Analysis for the Selected 20 Variables

The results of the eigen analysis of finally selected 20 variables shown in Table 4.9.

Table 4.9: Eigen Analysis for the Final 20 Variables

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.309	21.544	21.544	4.309	21.544	21.544	3.046	15.230	15.230
2	2.958	14.792	36.336	2.958	14.792	36.336	2.703	13.514	28.744
3	2.008	10.038	46.374	2.008	10.038	46.374	2.331	11.656	40.399
4	1.614	8.069	54.443	1.614	8.069	54.443	2.039	10.194	50.593
5	1.280	6.399	60.842	1.280	6.399	60.842	1.661	8.304	58.898
6	1.177	5.884	66.725	1.177	5.884	66.725	1.566	7.828	66.725
7	.852	4.261	70.987						
8	.750	3.752	74.739						
9	.667	3.333	78.072						
10	.634	3.172	81.244						
11	.583	2.914	84.158						
12	.497	2.485	86.643						
13	.492	2.460	89.103						
14	.461	2.304	91.407						
15	.386	1.928	93.335						
16	.364	1.822	95.157						
17	.317	1.585	96.743						
18	.289	1.443	98.186						
19	.207	1.034	99.220						
20	.156	.780	100.000						

According to the Table 4.9 six factors have eigenvalue greater than 1. Factor 1 to 6 accounts 21.544, 14.792, 10.038, 8.069, 6.399 and 5.884 variability of the 20 variable results. 6 variables are able to 66.72% variability accounted. Then it was decided considerm6 factor model. In order to make factor were rotated using orthogonal

varimax rotation. Then it was found the total variability acquired 66.72 has been distributed among the rotated factors shown in Table 4.9. This was confirm figure 4.7.

Scree Plot of the Twenty Variables

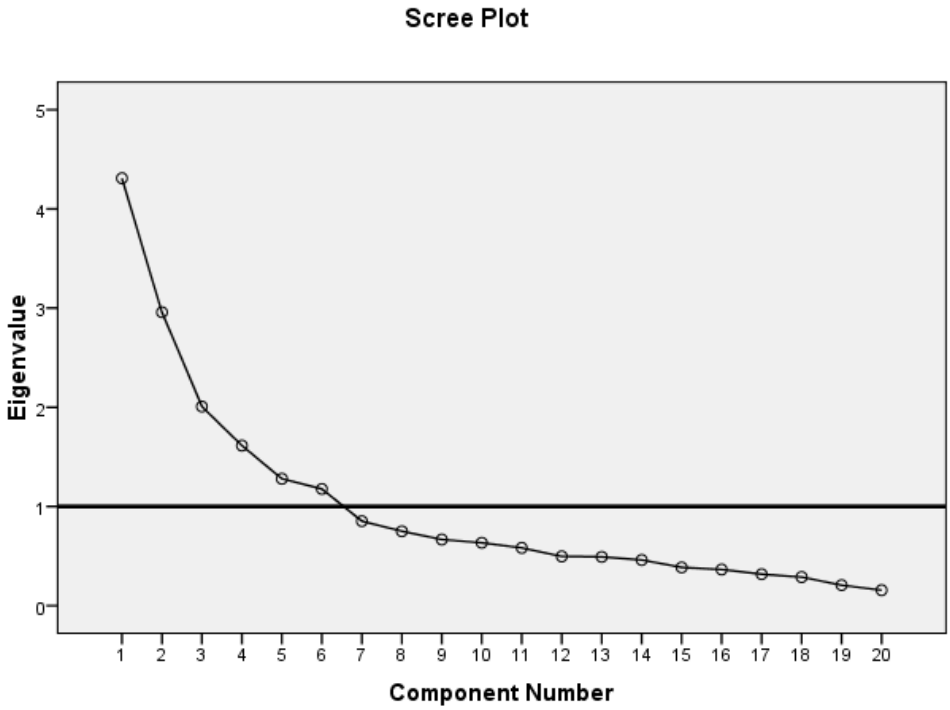

Figure 4.7: Scree Plot for Selected Model

According to the figure 4.7 six factors have steep slope. Also curve began to flatten between factors six and seven and factor six onwards have an eigenvalue of less than one.

Factor Loadings for Selected 6- Factors (Principle Component Factoring & Varimx Rotation

The table 4.10 shows the factor loadings of the six factor model after varimax rotation.

Table 4.10: Factor Loadings of 6-factor Model [PCF & Verimax]

Variables	Factor Loadings					
	1	2	3	4	5	6
Group Study [S1]	-.091	.646	.241	.030	-.153	.144
Coverage of Missed Lessons[S2]	.054	.788	.103	.021	-.101	.038
Sharing Knowledge [S3]	.088	.633	.445	.056	.016	-.067
Sensitive in the Issues of Friends [S4]	-.006	.727	-.146	-.186	.118	.239
Assistance to the issues by friends [S5]	.011	.771	-.059	-.101	.182	.094
Answers the Questions without any Hesitation [S6]	.297	.050	.085	-.083	.684	-.112
Others' Attention [S8]	-.119	-.013	.049	-.047	.834	.035
Confidence in Pass the Exam [S9]	.498	-.008	.235	-.171	.517	.060
Satisfy in Academic Activities [S10]	.633	.040	.105	-.204	.274	.010
Enthusiastic to Get High Marks [S11]	.828	.035	-.090	-.083	-.070	-.066
Enthusiastic to Answer the Questions [S12]	.867	-.047	.201	-.038	-.001	.080
Competitive in Studies [S13]	.808	.012	.191	-.034	.081	.037
Competitive in Extra-curricular Activities. [S15]	.224	.038	.057	.230	-.093	.644
Mobile Phone Usage [S16]	-.178	-.061	-.105	.876	-.126	.076
Spend Time in Social Websites [S17]	-.137	-.056	-.038	.919	-.065	.061
Bring Friends to Correct Track [S18]	.042	.274	-.091	-.350	.061	.621
Spend Leisure Time with Friends [S19]	-.186	.164	.197	.120	.004	.771
Teachers' Timely Attendance to the Classes [S21]	.153	.097	.770	-.174	.006	-.004
Cover the Syllabus [S22]	.093	.104	.777	-.179	.127	.200
Additional Time to Cover the Syllabus [S23]	.136	.038	.787	.187	.115	.016

Rotation is make factor loadings simpler to identify the variable to each of the selected factors. A factor loading for a variable is a measure of how much the variable contributes to the factor. High factor loading scores indicate that the dimensions of the factors are better accounted for by the variables.

Results in Table 4.10 indicate that the variables S10-S13 got high loadings greater than 0.6. Variable S1-S5 in factor two also have factor loadings greater than 0.6. S21-S23 have factor loading greater than 0.77 and S16 and S17 have factor loading greater than 0.8. S6-S9 also have greater than 0.5 loadings. The identified variables for the six factors can show in Table 4.11.

Table 4.11: Identified Variables for the Factors

Factor	Variable
Factor 1	Satisfy on academic activities [S10]
	Enthusiastic to get high marks [S11]
	Enthusiastic to answer the questions [S12]
	Competitive in studies [S13]
Factor 2	Group study [S1]
	Coverage of missed lessons [S2]
	Sharing knowledge [S3]
	Sensitive to the issues of friend [S4]
	Assistance to the issues by friends [S5]
Factor 3	Teachers' timely attendance to the classes [S21]
	Cover the syllabus [S22]
	Additional time to cover the syllabus [S23]
Factor 4	Mobile phone usage [S16]
	Spend time in social websites [S17]
Factor 5	Answers the questions without any hesitation [S6]
	Others' attention [S8]
	Confidence in pass the exam [S9]
Factor 6	Competitive in extracurricular Activities [S15]
	Bring Friends to the Correct Track [S18]
	Spend Leisure Time with Friends [S19]

4.3.3 Factor Extraction via Other Orthogonal Rotations

In order to check the selected factors are invariant at the type of other orthogonal rotation for the principle component factoring method. Factors were rotated by using quartimax and equamax corresponding results of factor loading are shown in Table 4.12 and Table 4.13

Table 4.12: Factor Loadings of 6- Factor Model [PCF & Quartimax]

Variables	Factor Loadings					
	1	2	3	4	5	6
Group Study [S1]	-.094	.651	.237	.036	-.152	.127
Coverage of Missed Lessons[S2]	.051	.789	.095	.031	-.106	.018
Sharing Knowledge [S3]	.094	.634	.438	.066	.007	-.084
Sensitive to the Issues of Friend [S4]	.002	.734	-.150	-.179	.117	.221
Assistance to the issues by friends [S5]	.020	.774	-.064	-.093	.180	.074
Answers the Questions without any Hesitation [S6]	.328	.051	.084	-.075	.670	-.116
Others' Attention [S8]	-.083	-.008	.057	-.050	.838	.033
Confidence in Pass the Exam [S9]	.526	-.001	.230	-.160	.494	.057
Satisfy in Academic Activities [S10]	.650	.043	.097	-.189	.246	.007
Enthusiastic to Get High Marks [S11]	.824	.033	-.105	-.064	-.104	-.068
Enthusiastic to Answer the Question [S12]	.870	-.044	.187	-.019	-.039	.079
Competitive in Studies [S13]	.814	.015	.178	-.015	.046	.034
Competitive in Extra-curricular Activities. [S15]	.217	.052	.055	.235	-.101	.642
Mobile Phone Usage [S16]	-.204	-.069	-.103	.871	-.116	.080
Spend Time in Social Websites [S17]	-.160	-.065	-.037	.915	-.057	.065
Bring Friends to Correct Track [S18]	.052	.293	-.091	-.347	.060	.613
Spend Leisure Time with Friends [S19]	-.184	.184	.201	.117	.011	.766
Teachers' Timely Attendance to the Classes [S21]	.169	.105	.767	-.168	-.007	-.010
Cover the Syllabus [S22]	.115	.118	.776	-.174	.117	.193
Additional Time to Cover the Syllabus [S23]	.149	.043	.785	.192	.104	.012

Factor loadings for the 6- factor model when factors were rotated by Quartimax rotation are shown in table 4.11. According to that S9, S10, S11, S12 and S13 variables are highly correlated with factor 1. Similarly, the initial variable S1, S2, S3, S4 and S5 are highly correlated with factor 2. Variables S21, S22 and S23 are highly correlated with common factor 3. S16 and S17 variables highly correlate with fourth common factor. Fifth common factor consists of S6 and S8. S15, S18 and S19 variables are correlated with sixth common factor.

Table 4.13: Factor Loadings of 6- Factor Model [PCF & Equamax]

Variables	Factor Loadings					
	1	2	3	4	5	6
Group Study [S1]	-.086	.637	.247	.020	-.153	.175
Coverage of Missed Lessons[S2]	.058	.785	.113	.003	-.093	.075
Sharing Knowledge [S3]	.079	.631	.454	.038	.031	-.033
Sensitive to the Issues of Friend [S4]	-.019	.713	-.143	-.199	.117	.272
Assistance to the issues by friends [S5]	-.005	.763	-.055	-.116	.185	.129
Answers the Questions without any Hesitation [S6]	.247	.050	.081	-.094	.704	-.106
Others' Attention [S8]	-.177	-.019	.033	-.042	.825	.036
Confidence in Pass the Exam [S9]	.451	-.019	.234	-.189	.552	.066
Satisfy in Academic Activities [S10]	.603	.033	.112	-.227	.317	.017
Enthusiastic to Get High Marks [S11]	.829	.038	-.073	-.112	-.015	-.061
Enthusiastic to Answer the Questions [S12]	.859	-.054	.215	-.068	.059	.083
Competitive in Studies [S13]	.795	.007	.204	-.063	.137	.042
Competitive in Extra-curricular Activities. [S15]	.234	.013	.059	.224	-.079	.645
Mobile Phone Usage [S16]	-.136	-.045	-.103	.884	-.138	.069
Spend Time in Social Websites [S17]	-.099	-.039	-.036	.925	-.073	.055
Bring Friends to the Correct Track [S18]	.024	.239	-.096	-.354	.061	.633
Spend Leisure Time with Friends [S19]	-.189	.128	.189	.125	-.007	.778
Teachers Timely Attendance to the Classes [S21]	.131	.085	.772	-.184	.027	.008
Cover the Syllabus [S22]	.061	.083	.775	-.186	.143	.212
Additional Time to Cover the Syllabus [S23]	.118	.032	.789	.178	.135	.025

Factor loadings for the 6- factor model when factors were rotated in equamax rotation are shown in table 4.13. It can be seen that the initial variables S10, S11, S12 and S13 load more highly on the first common factor. Also, initial variables S1, S2, S3, S4 and

S5 load more highly on second common factor and S21, S22 and S23 variables highly load on third factor. S16 and S17 variables highly correlate with fourth common factor. Fifth common factor consist of S6, S8 and S9. S15, S18 and S19 variables are correlated with sixth common factor.

4.3.4 Factor Extraction via Other Extraction Methods

(Principle Axis Factoring Method)

This is applied in order to check whether the selected factors are invariant at the different extraction methods. Therefore it was used principle axis factoring method was used to extract. Factors were rotated by using varimax, quartimax and equamax. Corresponding results of factor loading are shown in Table 4.14, Table 4.15 and Table 4.16.

Table 4.14: Factor Loadings of 6- Factor Model [PAF & Varimax]

Variables	Factor Loadings					
	1	2	3	4	5	6
Group Study [S1]	-.078	.549	.224	.019	-.130	.147
Coverage of Missed Lessons[S2]	.038	.697	.131	.009	-.098	.061
Sharing Knowledge [S3]	.078	.533	.416	.020	.006	-.002
Sensitive to the Issues of Friends [S4]	.000	.697	-.102	-.137	.109	.181
Assistance to the Issues by Friends [S5]	.011	.709	-.014	-.075	.156	.083
Answers the Questions without any Hesitation [S6]	.274	.039	.111	-.100	.521	-.091
Others' Attention [S8]	-.065	5.929E-6	.055	-.061	.621	.014
Confidence in Pass the Exam [S9]	.458	.008	.225	-.154	.484	.045
Satisfy in Academic Activities [S10]	.553	.046	.121	-.172	.270	.001
Enthusiastic to Get High Marks [S11]	.745	.031	-.051	-.083	-.036	-.069
Enthusiastic to Answer the Questions [S12]	.879	-.054	.202	-.043	-.010	.103
Competitive in Studies [S13]	.748	.006	.198	-.050	.093	.046
Competitive in Extra-curricular Activities. [S15]	.157	.094	.070	.145	-.070	.368
Mobile Phone Usage [S16]	-.184	-.088	-.091	.792	-.172	.083
Spend Time in Social Websites [S17]	-.137	-.076	-.026	.959	-.080	.063
Bring Friends to the Correct Track [S18]	.061	.309	-.055	-.223	.073	.398
Spend Leisure Time with Friends [S19]	-.165	.172	.158	.090	-.008	.794
Teachers' Timely Attendance to the Classes [S21]	.159	.111	.666	-.124	.054	-.005
Cover the Syllabus [S22]	.108	.121	.702	-.143	.144	.183
Additional Time to Cover the Syllabus [S23]	.131	.023	.704	.135	.099	.052

Factor loadings for 6- factor model when factors were rotated varimax rotation are shown in Table 4.14. It is the same trend of equamax rotation.

Table 4.15: Factor Loadings of 6- Factor Model [PAF & Quartimax]

Variables	Factor Loadings					
	1	2	3	4	5	6
Group Study [S1]	-.080	.559	.217	.028	-.130	.118
Coverage of Missed Lessons[S2]	.035	.700	.119	.023	-.104	.025
Sharing Knowledge [S3]	.086	.537	.406	.033	-.006	-.032
Sensitive to the Issues of Friends [S4]	.009	.707	-.110	-.124	.108	.145
Assistance to the Issues by Friends [S5]	.022	.714	-.022	-.062	.153	.046
Answers for the Questions without any Hesitation [S6]	.308	.040	.109	-.091	.503	-.096
Others' Attention [S8]	-.026	.005	.063	-.062	.623	.012
Confidence in Pass the Exam [S9]	.494	.018	.220	-.139	.454	.040
Satisfy in Academic Activities [S10]	.575	.051	.111	-.155	.236	-.006
Enthusiastic to Get High Marks [S11]	.742	.027	-.068	-.061	-.079	-.074
Enthusiastic to Answer the Questions [S12]	.883	-.046	.184	-.018	-.063	.100
Competitive in Studies [S13]	.758	.012	.182	-.027	.048	.040
Competitive in Extra-curricular Activities. [S15]	.152	.111	.066	.152	-.079	.362
Mobile Phone Usage [S16]	-.218	-.099	-.087	.784	-.159	.089
Spend Time in Social Websites [S17]	-.169	-.090	-.022	.953	-.071	.068
Bring Friends to the Correct Track [S18]	.072	.333	-.058	-.215	.069	.381
Spend Leisure Time with Friends [S19]	-.160	.214	.164	.090	.001	.784
Teachers' Timely Attendance to the Classes [S21]	.180	.122	.661	-.117	.036	-.016
Cover the Syllabus [S22]	.137	.144	.700	-.136	.129	.171
Additional Time to Cover the Syllabus [S23]	.148	.034	.702	.140	.084	.045

Factor loadings for 6- factor model when factors were rotated quartimax rotation is shown in Table 4.15

Table 4.16: Factor Loadings of 6- Factor Model [PAF & Equamax]

Variables	Factor Loadings					
	1	2	3	4	5	6
Group Study [S1]	-.078	.549	.224	.019	-.130	.147
Coverage of Missed Lessons[S2]	.038	.697	.131	.009	-.098	.061
Sharing Knowledge [S3]	.078	.533	.416	.020	.006	-.002
Sensitive to the Issues of Friends [S4]	.000	.697	-.102	-.137	.109	.181
Assistance to the Issues by Friends [S5]	.011	.709	-.014	-.075	.156	.083
Answers for the Questions without any Hesitation [S6]	.274	.039	.111	-.100	.521	-.091
Others' Attention [S8]	-.065	5.929E-6	.055	-.061	.621	.014
Confidence in Pass the Exam [S9]	.458	.008	.225	-.154	.484	.045
Satisfy in Academic Activities [S10]	.553	.046	.121	-.172	.270	.001
Enthusiastic to Get High Marks [S11]	.745	.031	-.051	-.083	-.036	-.069
Enthusiastic to Answer the Questions [S12]	.879	-.054	.202	-.043	-.010	.103
Competitive in Studies [S13]	.748	.006	.198	-.050	.093	.046
Competitive in Extra-curricular Activities. [S15]	.157	.094	.070	.145	-.070	.368
Mobile Phone Usage [S16]	-.184	-.088	-.091	.792	-.172	.083
Spend Time in Social Websites [S17]	-.137	-.076	-.026	.959	-.080	.063
Bring Friends to the Correct Track [S18]	.061	.309	-.055	-.223	.073	.398
Spend Leisure Time with Friends [S19]	-.165	.172	.158	.090	-.008	.794
Teachers Timely Attendance to the Classes [S21]	.159	.111	.666	-.124	.054	-.005
Cover the Syllabus [S22]	.108	.121	.702	-.143	.144	.183
Additional Time to Cover the Syllabus [S23]	.131	.023	.704	.135	.099	.052

Factor loadings for 6- factor model when factors were rotated equamax rotation is shown in Table 4.16.

Table 4.17: Summary of Different Factor Rotation Methods and Different Extraction Methods

Extraction	**Rotation**	**Factors**					
		1	**2**	**3**	**4**	**5**	**6**
Principle Component Analysis (PCA)	Verimax	S_{10} S_{11} S_{12} S_{13}	S_1 S_2 S_3 S_4 S_5	S_{21} S_{22} S_{13}	S_{16} S_{17}	S_6 S_8 S_9	S_{15} S_{18} S_{19}
	Quartimax	S_9 S_{10} S_{11} S_{12} S_{13}	S_1 S_2 S_3 S_4 S_5	S_{21} S_{22} S_{13}	S_{16} S_{17}	S_6 S_8	S_{15} S_{18} S_{19}
	Equamax	S_{10} S_{11} S_{12} S_{13}	S_1 S_2 S_3 S_4 S_5	S_{21} S_{22} S_{13}	S_{16} S_{17}	S_6 S_8 S_9	S_{15} S_{18} S_{19}
Principal Axis Factoring (PAF)	Verimax	S_{10} S_{11} S_{12} S_{13}	S_1 S_2 S_3 S_4 S_5	S_{21} S_{22} S_{13}	S_{16} S_{17}	S_6 S_8 S_9	S_{15} S_{18} S_{19}
	Quartimax	S_9 S_{10} S_{11}	S_1 S_2 S_3	S_{21} S_{22} S_{13}	S_{16} S_{17}	S_6 S_8	S_{15} S_{18} S_{19}

		S_{12} S_{13}	S_4 S_5				
	Equamax	S_{10} S_{11} S_{12} S_{13}	S_1 S_2 S_3 S_4 S_5	S_{21} S_{22} S_{13}	S_{16} S_{17}	S_6 S_8 S_9	S_{15} S_{18} S_{19}

As per the table 4.17 it can be seen that the variables of each factor have not changed due to the changes of extraction method and rotation method. But when quartimax rotation applied with principle component analysis and principle axis factoring methods, only one variable [S_9] is correlates with factor 2. All other methods are correlated with factor five.

These extracted factors should be identified by entity name. Therefore it should be labeled.

4.4 Factor Labeling

- Factor one highly correlates with the statements of
  - I'm satisfied in my academic activities.
  - I'm enthusiastic to get higher marks than others.
  - I'm more enthusiastic to answer the questions raised by the teachers in relation to the subjects than other students.
  - I'm very competitive in functions related to studies.

  Therefore, it can be labeled as the **competitiveness**

- Second factor highly correlated with statements of
  - I like more to engage in group studies than individual studies.
  - My friends extend cooperation to coverage of missed lessons.

- I share knowledge which I have obtained from extra classes with my friends.
- I am sensitive to the issues of my friends. I assist them to solve such issues.
- My friends provide their assistance to solve my issues.

Therefore it can be labeled as **cooperation**

- Third factor highly correlates with the statements of
    - The teacher in charge of the subject comes to the classroom in the scheduled periods.
    - The teacher duly covers the syllabus within the given time.
    - When the teacher is unable to cover the syllabus in the given time he/she gets additional time and covers it.

    Therefore it can be labeled as **teachers' dedication.**

- Fourth factor highly correlates with the statements of
    - I spend more time with mobile phones.
    - I spend more time in the social websites.

  Therefore it can be labeled as **addiction**
- Fifth factor highly correlates with the statements of
    - I give answers to the questions raised by the teachers in the class room without any hesitation.
    - I'm hesitant to get others' attention in the classroom
    - I have confidence in passing G.C.E (O/L) examination.

  Therefore it can be labeled as **confidence.**
- Sixth factor highly correlates with the statements of
    - I'm competitive in the extra-curricular activities.
    - I make effort to bring my friends to the correct track when they are in wrong doings/ addicts.
    - I spend my holidays and leisure times with my friends.

Therefore, it can be labeled as **peer affect.**

4.5 Factor Score Coefficient

It is necessary to define factors from original variables. Therefore factor scores were estimated. The factor score coefficients are a function of the original standardized variable.

Table 4.18: Factor Score Coefficient Obtained under PCF & Verimax Rotation

Factor Name	Variable	Factor Score Coefficient
Competitiveness	Satisfy in academic activities [S10]	0.195
	Enthusiastic to get high marks [S11]	0.335
	Enthusiastic to answer the questions [S12]	0.313
	Competitive in studies [S13]	0.286
Cooperation	Group study [S1]	0.238
	Coverage of missed lessons [S2]	0.333
	Sharing knowledge [S3]	0.257
	Sensitive in the issues of friends [S4]	0.276
	Assistance to the issues by friends [S5]	0.320
Teachers' Dedication	Teachers' timely attendance to the classes [S21]	0.368
	Cover the syllabus [S22]	0.357
	Additional time for cover the syllabus [S23]	0.366
Addiction	Mobile phone usage [S16]	0.456
	Spend time in social websites [S17]	0.493
Confidence	Answers the questions without any hesitation [S6]	0.429
	Others' attention [S8]	0.578
	Confidence in pass the exam [S9]	0.274
Peer Affects	Competitive in extra-curricular activities [S15]	0.440
	Bring friends to the correct track [S18]	0.425
	Spend leisure time with friends [S19]	0.512

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

The objective of the study was to identify the influential factors on academic performance of single sex education system and co-education system. The conclusions and recommendations obtained based on the results of the data analyses are discussed in this chapter.

5.1 Conclusions

The identified conclusions are:

- There are six factors identified for the performance of single education and co-education system in Colombo Education Zone schools. They are: (i) competitiveness, (ii) cooperation, (iii) teachers' dedication, (iv) confidence, (v) addiction and (vi) peer's effects.
- Each factor is a linear function of different variables and the number of variables identified by the factors varies from two to four.
- The six factors are defined as follows:

  Factor 1 = $0.195*S_{10}+0.335*S_{11}+0.313*S_{12}+0.286*S_{13}$

  Factor 2 = $0.238*S_{1}+0.333*S_{2}+0.257*S_{3}+0.267*S_{4}+0.320*S_{5}$

  Factor 3 = $0.368*S_{21}+0.357*S_{22}+0.366*S_{23}$

  Factor 4 = $0.456*S_{16}+0.493*S_{17}$

  Factor 5 = $0.429*S_{6}+0.578*S_{8}+0.274*S_{9}$

  Factor 6 = $0.44*S_{15}+0.425*S_{18}+0.512*S_{19}$

  (The names of the variables S_i, i=1,2,….23)

The above results are influenced to the academic performance of single sex education system and co-education system in senior secondary level education.

5.2 Recommendations

- Confidence of the students is important to their performance. Therefore, necessary action can be taken to improve the confidence of students in classroom background.
- A reward system can be introduced for the teachers who attend the class on time.
- Teachers should pay more attention to behavior of the students in the classroom.
- Teachers should motivate the students and should avoid hesitation form the students' mind in the classroom.
- Corporation is a valuable factor for the students for their studies. Because every student wants help from others any time. Attitudes of the children should be changed. The environment in the class should be directed to promote the good attitudes that relate to the corporation.
- Similar studies should be extended to other educational zones in Sri Lanka.
- In the references of this study were acquired irrespective of the school type. Thus, it is better to test the above results are invariant of the type of school.

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APPENDICES

Appendix – A: Schools in Colombo Educational Zone

S_No	Name	National/ Provincial	School Type	Co_Edu/ Single Sex
1	DE LA SALLE COLLEGE	2	1	BOYS
2	MODARA ANANDA M.M.V.	2	2	MIXED
3	ST.ANTHONY'S B.M.V.	2	2	GIRLS
4	KUMARA V.	2	3	MIXED
5	MATT.ST.JOHN'S M.V.	2	3	MIXED
6	ST.LUCIA'S COLLEGE	2	3	BOYS
7	KOTAHENA PRESIDENT COLLEGE	2	3	MIXED
8	ST.ANDREW'S V.	2	3	MIXED
9	SRI MEDHANANDA V.	2	3	MIXED
10	MODARA ST.JOHN'S V.	2	3	MIXED
11	AVE MARIA V.	2	3	MIXED
12	SRI SANGHABODHI V.	2	3	MIXED
13	BLOEMENDHAL SIN.V.	2	3	MIXED
14	MAHAWATTA ST.ANTHONY'S SIN.V.	2	3	MIXED
15	ROMAN CATHOLIC B.V.	2	3	GIRLS
16	AGAMETHI V.	2	3	MIXED
17	SIR RAZIK FAREED MUS.B.V.	2	2	MIXED
18	HAMZA MUS.V.	2	2	MIXED
19	KALAIMAGAL T.V.	2	3	MIXED
20	MAHAWATTA ST.ANTHONY'S T.M.V.	2	2	MIXED
21	GOOD SHEPHERD G.M.V.	2	2	GIRLS
22	MUTWAL HINDU COLLEGE	2	2	MIXED
23	KOTAHENA METHODIST T.V.	2	3	MIXED
24	KOTAHENA M.M.V.	1	1	MIXED
25	SRI SANGARAJA M.M.V.	2	3	MIXED
26	MAHABODHI V.	2	2	BOYS
27	RAJASINGHE M.V.	2	2	BOYS
28	MIHINDU MAWATHA SIN.M.V.	2	3	MIXED
29	SIRI SARIPUTTHA M.V.	2	3	MIXED
30	VIJAYABA M.V.	2	3	MIXED
31	ST.JOSEPH'S B.M.V.	2	2	GIRLS
32	ST.JOSEPH'S BOYS V.	2	2	BOYS
33	WOLFENDHAL B.M.V.	2	2	GIRLS
34	ST.ANTHONY'S B.M.V.	2	2	GIRLS
35	CLIFTON B.M.V.	2	2	GIRLS
36	HOLY ROSARY R.C.SIN.V.	2	3	MIXED

37	VIHARAMAHA DEVI B.V.	2	3	GIRLS
38	HEMAMALI B.V.	2	2	GIRLS
39	ST.MARY'S V.	2	3	MIXED
40	JAYANTHI V.	2	3	MIXED
41	A.E.GUNASINGHA V.	2	3	MIXED
42	AL HIDHAYA V.	2	2	MIXED
43	AL IQBAL B.V.	2	3	GIRLS
44	AL NASSER V.	2	2	MIXED
45	HAMEED AL HUSSEINIE COLLAGE	1	1	BOYS
46	DHARUSSALAAM V.	2	2	MIXED
47	FATHIMA MUS.LADIES V.	2	1	GIRLS
48	KHAIRIYA MUS.B.V.	2	1	GIRLS
49	ST.SEBASTIAN T.M.V.	2	3	MIXED
50	VIVEKANANDA V.	1	1	MIXED
51	THONDAR GOVT.T.V.	2	3	MIXED
52	ST.ANNE'S GIRL'SBM.V.	2	2	GIRLS
53	ST.ANTHONY'S BOYS M.V.	2	2	BOYS
54	KANAPATHY HINDU LADIES M.V.	2	2	GIRLS
55	HOLY ROSARY T.V.	2	3	MIXED
56	COLOMBO CENTRAL HINDU M.V.	2	2	BOYS
57	DR.BADIUDDIN MAHMUD V.	2	3	MIXED
58	T.B.JAYAH ZAHIRA V.	2	2	BOYS
59	AL HIKMA V.	2	2	MIXED
60	DEVI B.V.	1	1	GIRLS
61	SUJATHA B.V.	2	3	GIRLS
62	ARETHUSA V.	2	3	BOYS
63	SRI PARAKRAMABAHU M.V.	2	2	MIXED
64	MAHAMATHYA V.	2	3	MIXED
65	SRI SADDHARMODAYA M.V.	2	3	MIXED
66	S.W.R.D.BANDARANAYAKE V.	2	3	MIXED
67	VIDYATHILAKA V.	2	3	MIXED
68	SIRIMAVO BANDARANAYAKE V.	1	1	GIRLS
69	DUDLEY SENANAYAKA V.	2	2	MIXED
70	ISIPATHANA COLLEGE	1	1	BOYS
71	LUMBINI V.	1	1	MIXED
72	MAHANAMA COLLEGE	1	1	BOYS
73	ST.PAUL'S B.V.	1	1	GIRLS
74	VISAKHA V.	1	1	GIRLS
75	ST.ANTHONY'S B.M.V.	2	2	GIRLS
76	ST.CLARE'S B.M.V.	2	1	GIRLS
77	LINDSAY B.V.	2	1	GIRLS
78	ST.MARY'S B.M.V.	2	2	GIRLS

79	ST.MICHAEL'S COLLEGE	2	3	BOYS
80	ST.MARY'S SIN.MIX.V.	2	3	MIXED
81	KUMARAUTHAYAM T.V.	2	3	MIXED
82	RAMAKRISHNA V.	2	2	MIXED
83	MUSLIM LADIES COLLEGE	1	1	GIRLS
84	HINDU COLLEGE	1	1	BOYS
85	AL AMEEN V.	2	3	MIXED
86	ST.MARY'S T.V.	2	2	MIXED
87	KOLLUPITIYA METHODIST G.T.V.	2	3	MIXED
88	RAMANATHAN HIN.LADIES COLLEGE	1	1	GIRLS
89	DEFENCE SERVICES COLLEGE	1	3	MIXED
90	ROYAL COLLEGE	1	1	BOYS
91	ANANDA COLLEGE	1	1	BOYS
92	NALANDA COLLEGE	1	1	BOYS
93	THURSTAN COLLEGE	1	1	BOYS
94	ST.MATTHEWS COLLEGE	2	2	BOYS
95	ANANDA B.V.	1	1	GIRLS
96	GOTHAMI B.V.	1	1	GIRLS
97	ST.JOHN'S COLLEGE	2	2	BOYS
98	SEEVALI M.M.V.	2	2	MIXED
99	SUSAMAYAWARDHANA V.	2	2	BOYS
100	ALL SAINTS' B.M.V.	2	2	GIRLS
101	YASODARA B.V.	2	1	GIRLS
102	PRESBYTERIAN B.V.	2	2	GIRLS
103	RATHNAWALI B.M.V.	2	2	GIRLS
104	D.S.SENANAYAKE COLLEGE	1	1	BOYS
105	ANURUDDHA B.V.	2	2	GIRLS
106	VELUWANA COLLEGE	2	1	BOYS
107	ASOKA V.	2	1	BOYS
108	C.W.W.KANNANGARA V.	2	1	MIXED
109	VIPULANANTHA T.M.V.	2	1	MIXED
110	AL HIJRA MUS.V.	2	3	MIXED

Appendix – B: Questionnaire

Q_No:

Statistical Research for the Identification of Factors Affected the Academic Results of the Students in the Co-educational Schools and the Single Sex Schools in the Colombo Educational Zone

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These particulars are collected for the purpose of the above research. You are kindly requested to give answers correctly and honestly. Your answers will be confidential.

I. Your school : Co-Educational School ☐ Single Sex School ☐

II. Sex : Male ☐ Female ☐

III. Please mark √ in the relevant cage

1.You like more engage in group study than individual study

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

2.Your friends extend cooperation to cover of missed lessons.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

3.You share knowledge you have obtained from extra classes with your friends.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

4.You are sensitive to the issues of your friends. You assists them to solve such issues.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

5.Your friends provide their assistance to solve your issues.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

6.You give answers to the questions raised by the teachers in the class room without any hesitation.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

7.When you answer the questions raised by the teachers in the classroom, you are teased by your friends.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

8.You are hesitant to get others' attention in the classroom.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

9.You have confidence in passing G.C.E (O/L) examination.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

10. You are satisfied in your academic activities.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

11. You are enthusiastic to get marks higher than others.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

12. You are more enthusiastic to answer the questions raised by the teachers in relate to the subjects than other students.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

13. You are very competitive in the functions related to the studies.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

14. You have got used to take alcohol and drugs.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

15. You are competitive in the extra-curricular activities.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

16. You spend more time with mobile phones.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

17. You spend more time in the social websites.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

18. You make effort to bring your friends to the correct track when they are doing wrong doings/ addicts.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

19. You spend your holidays and leisure times with your friends.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

20. There is a teacher for every subject.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

21. The incharge of the subject comes to the classroom in the scheduled periods.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

22. The teacher duly covers the subject within the given time.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

23. When the teacher is unable to cover the syllabus in the given time he/she gets additional time and covers it.

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

24. There are sufficient facilities such as laboratories, libraries, and computer laboratories etc. required to the academic activities in comparison with the other school. (in comparison with the other schools in the zone)

1-False ☐ 2- Slightly True ☐ 3-True ☐ 4-Totally True ☐

Appendix – C: Correlation Matrix

		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
S1	**r^2**	1.000	0.460	0.490	0.332	0.289	-0.085	-0.040	0.000	-0.055	-0.006	-0.037	-0.048
	P_Val		0.000	0.000	0.000	0.000	0.071	0.247	0.498	0.171	0.459	0.259	0.204
S2	**r^2**	0.460	1.000	0.450	0.454	0.469	-0.022	0.000	-0.053	0.043	0.033	0.045	0.011
	P_Val	0.000		0.000	0.000	0.000	0.355	0.496	0.179	0.229	0.287	0.219	0.428
S3	**r^2**	0.490	0.450	1.000	0.253	0.361	0.073	0.020	0.054	0.158	0.126	0.011	0.134
	P_Val	0.000	0.000		0.000	0.000	0.103	0.363	0.176	0.003	0.015	0.424	0.010
S4	**r^2**	0.332	0.454	0.253	1.000	0.623	0.059	0.086	0.074	0.037	0.078	0.051	-0.025
	P_Val	0.000	0.000	0.000		0.000	0.155	0.068	0.099	0.262	0.089	0.192	0.332
S5	**r^2**	0.289	0.469	0.361	0.623	1.000	0.171	0.075	0.032	0.083	0.063	0.010	-0.016
	P_Val	0.000	0.000	0.000	0.000		0.002	0.097	0.290	0.075	0.140	0.434	0.393
S6	**r^2**	-0.085	-0.022	0.073	0.059	0.171	1.000	0.216	0.338	0.351	0.329	0.204	0.274
	P_Val	0.071	0.355	0.103	0.155	0.002		0.000	0.000	0.000	0.000	0.000	0.000
S7	**r^2**	-0.040	0.000	0.020	0.086	0.075	0.216	1.000	0.281	0.266	0.112	0.116	0.048
	P_Val	0.247	0.496	0.363	0.068	0.097	0.000		0.000	0.000	0.026	0.022	0.206
S8	**r^2**	0.000	-0.053	0.054	0.074	0.032	0.338	0.281	1.000	0.332	0.115	-0.074	-0.038
	P_Val	0.498	0.179	0.176	0.099	0.290	0.000	0.000		0.000	0.023	0.101	0.256
S9	**r^2**	-0.055	0.043	0.158	0.037	0.083	0.351	0.266	0.332	1.000	0.502	0.338	0.400
	P_Val	0.171	0.229	0.003	0.262	0.075	0.000	0.000	0.000		0.000	0.000	0.000
S10	**r^2**	-0.006	0.033	0.126	0.078	0.063	0.329	0.112	0.115	0.502	1.000	0.398	0.513
	P_Val	0.459	0.287	0.015	0.089	0.140	0.000	0.026	0.023	0.000		0.000	0.000
S11	**r^2**	-0.037	0.045	0.011	0.051	0.010	0.204	0.116	-0.074	0.338	0.398	1.000	0.650
	P_Val	0.259	0.219	0.424	0.192	0.434	0.000	0.022	0.101	0.000	0.000		0.000
S12	**r^2**	-0.048	0.011	0.134	-0.025	-0.016	0.274	0.048	-0.038	0.400	0.513	0.650	1.000
	P_Val	0.204	0.428	0.010	0.332	0.393	0.000	0.206	0.256	0.000	0.000	0.000	

Cont/-

Correlation Matrix (Continued)

		S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24
S1	r^2	-0.025	-0.013	0.130	-0.032	0.016	0.230	0.267	0.060	0.165	0.196	0.130	0.086
	P_Val	0.332	0.412	0.012	0.293	0.388	0.000	0.000	0.150	0.002	0.000	0.012	0.068
S2	r^2	-0.072	-0.035	0.100	-0.062	-0.048	0.211	0.205	0.204	0.143	0.135	0.130	-0.002
	P_Val	0.107	0.272	0.042	0.140	0.202	0.000	0.000	0.000	0.007	0.010	0.012	0.484
S3	r^2	0.178	0.009	0.100	-0.105	-0.059	0.110	0.152	0.152	0.279	0.327	0.333	0.140
	P_Val	0.001	0.439	0.042	0.034	0.155	0.029	0.004	0.004	0.000	0.000	0.000	0.008
S4	r^2	-0.037	-0.068	0.130	-0.157	-0.168	0.343	0.211	0.138	0.099	0.100	-0.050	0.017
	P_Val	0.264	0.120	0.012	0.003	0.002	0.000	0.000	0.009	0.044	0.041	0.192	0.387
S5	r^2	0.043	0.041	0.045	-0.110	-0.140	0.281	0.181	0.237	0.101	0.174	0.013	-0.027
	P_Val	0.232	0.242	0.218	0.029	0.008	0.000	0.001	0.000	0.041	0.001	0.414	0.319
S6	r^2	0.270	-0.104	-0.024	-0.227	-0.203	0.051	-0.115	0.114	0.146	0.209	0.177	0.204
	P_Val	0.000	0.037	0.338	0.000	0.000	0.189	0.023	0.024	0.006	0.000	0.001	0.000
S7	r^2	0.059	-0.118	-0.010	-0.151	-0.131	0.034	-0.037	0.134	0.131	0.170	-0.024	0.109
	P_Val	0.154	0.021	0.430	0.004	0.012	0.281	0.263	0.010	0.011	0.002	0.338	0.029
S8	r^2	0.023	-0.065	-0.060	-0.159	-0.100	0.062	0.020	-0.007	0.028	0.116	0.083	0.142
	P_Val	0.346	0.129	0.149	0.003	0.042	0.144	0.364	0.453	0.314	0.023	0.076	0.007
S9	r^2	0.465	-0.100	0.068	-0.332	-0.239	0.078	-0.003	0.323	0.275	0.298	0.227	0.301
	P_Val	0.000	0.042	0.121	0.000	0.000	0.089	0.481	0.000	0.000	0.000	0.000	0.000
S10	r^2	0.447	0.048	0.043	-0.305	-0.249	0.124	-0.081	0.253	0.258	0.173	0.136	0.182
	P_Val	0.000	0.205	0.229	0.000	0.000	0.016	0.080	0.000	0.000	0.001	0.009	0.001
S11	r^2	0.528	-0.046	0.107	-0.192	-0.184	0.036	-0.211	0.158	0.106	0.075	0.026	0.121
	P_Val	0.000	0.214	0.032	0.000	0.001	0.268	0.000	0.003	0.034	0.097	0.326	0.018
S12	r^2	0.723	0.064	0.166	-0.187	-0.165	0.072	-0.035	0.202	0.270	0.269	0.252	0.190
	P_Val	0.000	0.133	0.002	0.001	0.002	0.108	0.275	0.000	0.000	0.000	0.000	0.000

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Correlation Matrix (Continued)

		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
S13	**r^2**	-0.025	0.072	0.178	-0.037	0.043	0.270	0.059	0.023	0.465	0.447	0.528	0.723
	P_Val	0.332	0.107	0.001	0.264	0.232	0.000	0.154	0.346	0.000	0.000	0.000	0.000
S14	**r^2**	-0.013	-0.035	0.009	-0.068	0.041	-0.104	-0.118	-0.065	-0.100	0.048	-0.046	0.064
	P_Val	0.412	0.272	0.439	0.120	0.242	0.037	0.021	0.129	0.042	0.205	0.214	0.133
S15	**r^2**	0.130	0.100	0.100	0.130	0.045	-0.024	-0.010	-0.060	0.068	0.043	0.107	0.166
	P_Val	0.012	0.042	0.042	0.012	0.218	0.338	0.430	0.149	0.121	0.229	0.032	0.002
S16	**r^2**	-0.032	-0.062	-0.105	-0.157	-0.110	-0.227	-0.151	-0.159	-0.332	-0.305	-0.192	-0.187
	P_Val	0.293	0.140	0.034	0.003	0.029	0.000	0.004	0.003	0.000	0.000	0.000	0.001
S17	**r^2**	0.016	-0.048	-0.059	-0.168	-0.140	-0.203	-0.131	-0.100	-0.239	-0.249	-0.184	-0.165
	P_Val	0.388	0.202	0.155	0.002	0.008	0.000	0.012	0.042	0.000	0.000	0.001	0.002
S18	**r^2**	0.230	0.211	0.110	0.343	0.281	0.051	0.034	0.062	0.078	0.124	0.036	0.072
	P_Val	0.000	0.000	0.029	0.000	0.000	0.189	0.281	0.144	0.089	0.016	0.268	0.108
S19	**r^2**	0.267	0.205	0.152	0.211	0.181	-0.115	-0.037	0.020	-0.003	-0.081	-0.211	-0.035
	P_Val	0.000	0.000	0.004	0.000	0.001	0.023	0.263	0.364	0.481	0.080	0.000	0.275
S20	**r^2**	0.060	0.204	0.152	0.138	0.237	0.114	0.134	-0.007	0.323	0.253	0.158	0.202
	P_Val	0.150	0.000	0.004	0.009	0.000	0.024	0.010	0.453	0.000	0.000	0.003	0.000
S21	**r^2**	0.165	0.143	0.279	0.099	0.101	0.146	0.131	0.028	0.275	0.258	0.106	0.270
	P_Val	0.002	0.007	0.000	0.044	0.041	0.006	0.011	0.314	0.000	0.000	0.034	0.000
S22	**r^2**	0.196	0.135	0.327	0.100	0.174	0.209	0.170	0.116	0.298	0.173	0.075	0.269
	P_Val	0.000	0.010	0.000	0.041	0.001	0.000	0.002	0.023	0.000	0.001	0.097	0.000
S23	**r^2**	0.130	0.130	0.333	-0.050	0.013	0.177	-0.024	0.083	0.227	0.136	0.026	0.252
	P_Val	0.012	0.012	0.000	0.192	0.414	0.001	0.338	0.076	0.000	0.009	0.326	0.000
S24	**r^2**	0.086	-0.002	0.140	0.017	-0.027	0.204	0.109	0.142	0.301	0.182	0.121	0.190
	P_Val	0.068	0.484	0.008	0.387	0.319	0.000	0.029	0.007	0.000	0.001	0.018	0.000

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Correlation Matrix (Continued)

		S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24
S13	**r^2**	1.000	-0.054	0.124	-0.223	-0.168	0.097	-0.058	0.241	0.206	0.219	0.291	0.204
	P_Val		0.178	0.016	0.000	0.002	0.048	0.160	0.000	0.000	0.000	0.000	0.000
S14	**r^2**	-0.054	1.000	-0.049	0.108	0.162	-0.088	0.137	-0.064	-0.138	-0.135	0.021	0.007
	P_Val	0.178		0.200	0.031	0.003	0.064	0.009	0.136	0.008	0.010	0.360	0.454
S15	**r^2**	0.124	-0.049	1.000	0.104	0.147	0.127	0.319	0.084	0.075	0.102	0.098	0.120
	P_Val	0.016	0.200		0.037	0.005	0.014	0.000	0.072	0.098	0.039	0.044	0.019
S16	**r^2**	-0.223	0.108	0.104	1.000	0.827	-0.173	0.133	-0.157	-0.192	-0.185	-0.004	-0.061
	P_Val	0.000	0.031	0.037		0.000	0.001	0.011	0.003	0.000	0.001	0.470	0.145
S17	**r^2**	-0.168	0.162	0.147	0.827	1.000	-0.221	0.130	-0.113	-0.151	-0.177	0.076	-0.016
	P_Val	0.002	0.003	0.005	0.000		0.000	0.012	0.026	0.004	0.001	0.093	0.392
S18	**r^2**	0.097	-0.088	0.127	-0.173	-0.221	1.000	0.321	0.180	0.048	0.158	-0.059	0.070
	P_Val	0.048	0.064	0.014	0.001	0.000		0.000	0.001	0.202	0.003	0.156	0.113
S19	**r^2**	-0.058	0.137	0.319	0.133	0.130	0.321	1.000	0.102	0.037	0.235	0.175	0.079
	P_Val	0.160	0.009	0.000	0.011	0.012	0.000		0.039	0.260	0.000	0.001	0.087
S20	**r^2**	0.241	-0.064	0.084	-0.157	-0.113	0.180	0.102	1.000	0.439	0.324	0.281	0.285
	P_Val	0.000	0.136	0.072	0.003	0.026	0.001	0.039		0.000	0.000	0.000	0.000
S21	**r^2**	0.206	-0.138	0.075	-0.192	-0.151	0.048	0.037	0.439	1.000	0.611	0.478	0.380
	P_Val	0.000	0.008	0.098	0.000	0.004	0.202	0.260	0.000		0.000	0.000	0.000
S22	**r^2**	0.219	-0.135	0.102	-0.185	-0.177	0.158	0.235	0.324	0.611	1.000	0.498	0.396
	P_Val	0.000	0.010	0.039	0.001	0.001	0.003	0.000	0.000	0.000		0.000	0.000
S23	**r^2**	0.291	0.021	0.098	-0.004	0.076	-0.059	0.175	0.281	0.478	0.498	1.000	0.370
	P_Val	0.000	0.360	0.044	0.470	0.093	0.156	0.001	0.000	0.000	0.000		0.000
S24	**r^2**	0.204	0.007	0.120	-0.061	-0.016	0.070	0.079	0.285	0.380	0.396	0.370	1.000
	P_Val	0.000	0.454	0.019	0.145	0.392	0.113	0.087	0.000	0.000	0.000	0.000	